How Does Stress Shape Experience and Perceptions in Public Space?

Honors Thesis in City and Regional Planning

Presented in Fulfillment of the Requirements for *graduation with honors research distinction in City and Regional Planning in the* Knowlton School at The Ohio State University

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Abstract

Research on the how the urban environment effects mental health and well-being is in its infancy. Only in recent years have researchers began trying to understand the relationship between mental health and urban design (Khanade et al, 2018). Stress is a common mental health condition that many people living in urban environment face. With increased urbanization and the introduction of more urban stressors to peoples lives, understanding the connection of mental health and urban design becomes an important one. College students are a group that face stress at a high rate, due to the demand that academic performance creates, in addition to stressors of everyday life. Understanding the impact that design has on individuals stress levels, can lead to a set of informed guidelines to promote better mental well-being in public spaces.

Analyzing public space in the context of The Ohio State University, a group of eleven undergraduate students completed a mapping exercise and interview to better understand perceptions of public space and the factors of spatial design that can mitigate stressed responses. A space where students felt a connection to nature, a sense of belonging, secure, engaged or could exercise a level personal control over the space, were found to be more relaxing than environments that did not allow for these conditions. Designers might benefit from approaches such as adding natural elements, creating architectural interest, and dedicating spaces for seclusion or interaction. It is in design interventions like these that we can take a step closer to creating synergies between mental health and urban design.

Introduction

According to the United Nations by 2050, two thirds of the world's population will live in cities. Living in urban areas comes with a 40% higher risk of depression, 20% risk of anxiety, in addition to loneliness, isolation and stress (McCay, 2017). With increased urbanization and mental health cases rising, serious thought needs to be given to how cities are designed in order to promote better mental health outcomes. Planning for mental health becomes complicated due to the direct and indirect effects the built environment has on psychological well-being (McCay, 2017 and Evans, 2003). Environmental characteristics with direct effects on mental health include housing, crowding, noise, indoor air quality, and light and indirect methods include personal control, social support, and restoration, all things we as people encounter everyday (Evans, 2003).

There is a large body of knowledge on mental health and well-being that is lacking. Only in recent years have researchers began trying to understand the relationship between mental health and urban design, which about 100 years ago were thought to have almost no relationship (Khanade et al, 2018). Given previous research and gaps among mental health planning, this thesis will focus on stress in the built environment, more specifically trying to understand how stress effects the way people use and perceive public space. Utilizing the Ohio State University Campus and a population of college students, this study will look at designed features in spaces on the campus to understand what elements elicit positive and negative feelings and perceptions of a space. With this information recommendations will be suggested for how to improve campus design to promote improved mental well-being of college students.

Literature Review

Stress in the Built Environment

Previous research has found that a negative perception of the built environment could lead to chronic stress. Exposure to negative, stressful conditions in addition to environments that cause a physiological demand, can result in high levels of neural, endocrine, and immune stress (Hunt, 2019). The World Health Organization (WHO) defines stress as "the reaction people may have when presented with demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope." While stress is not a disease, it is linked with physical and mental health conditions.

Stress is a natural bodily response and is not necessarily dangerous when it is managed. When stress becomes chronic or recurring it can lead to depression, anxiety, under stimulation, and anger (DeVault, 2015). Stress can be brought on by psychological, physiological, neuroendocrine, and behavioral factors (Ulrich, 1999). Psychological factors are the emotional reactions and evaluation to situations. Physiological responses include changes in bodily activity levels such as elevated blood pressure and pulse rate. Neuroendocrine factors deal with hormone responses that stimulate the heart and blood vessels. Behavioral changes are the way one conducts themselves may take the form of drowsiness, anger, helplessness, and passivity (Ulrich, 1999).

Mental Health and Urban Design

Research has revealed a large gap in the body of knowledge concerning mental health and urban design (Khanade et al, 2018). According to the World Health Organization (WHO), mental health is defined as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life,

can work productively and fruitfully, and is able to make a contribution to his or her community". The built environment can be defined in many ways but is generally the part of the physical environment constructed by human activity.

Environmental psychology is a field of research that deals with how people interact with the built environment. Through research in this field, there is evidence to claim the built environment can be both helpful and harmful to the psychological and emotional needs of a person (DeVault, 2015). The overall quality of the of a space, therefore, influences the quality of experiences in that given space. A space or landscape which is designed without regard to the experience and the environmental stressors people might encounter can lead to increased levels of stress and anxiety. There is evidence to show that increasingly urban environments provoke more negative feelings, higher levels of fear, shortened attention, and decreased restoration from stress than more natural environments (DeVault, 2015). The built environment may trigger these stressors through factors including noise, lack of thermal comfort, reduced visibility, lighting quality, and weakened sense of security (DeVault, 2015). Only in recent years have researchers began trying to understand the relationship between mental health and urban design, with the body of accumulated knowledge being very minimal in terms of designing for mental health in the built environment.

Mental health and wellbeing are of increasing concern to cities and public health officials (White, 2013). Increased urbanization is correlated to negative mental health effects due to the detachment from natural environments in which humans have evolved in and adapted to over an evolutionary basis (White, 2013). More and more people are moving to cities and the stressors that come with this environment can take a toll on the mental health of individuals. Of the studies conducted some design insights have been discovered in terms of improved mental wellbeing, with the

utilization of natural elements among other more restorative techniques (Gharib, 2017).

Green spaces are commonly used as a coping technique to address stress and anxiety, due to the correlation found between nature and levels of restorativeness. But, even with this knowledge there is still a lack of literature on how the built environment affects people already living with a mental disorder order. The built environment is full of hidden messages and cues that influence people's behaviors. Unlike nature, which occurs without the aid of human touch, public space or any constructed environment is created to elicit a response, sometimes cognitive and other times subconsciously (Gharib, 2017).

The built environment effects mental health in two ways; directly and indirectly (Evans, 2003). Environmental characteristics with direct effects on mental health include housing, crowding, noise, indoor air quality, and light. In addition, the built environment can indirectly impact mental health by altering psychosocial processes with known mental health consequences to include personal control, social support, and restoration (Evans, 2013). In an urban environment almost everything is designed, manipulated by design or an accident resulting from the design. For example, weather can be affected by the microclimate in an area, causing health island effects. This is not created intentionally in the design but is a misalignment of design (Golembiewski, 2015). When designing a space that is embedded with meanings, triggers and symbols it is important to understand how people with mental illnesses respond to specific designed conditions (Golembiewski, 2015).

Impacts of the Natural Environment and Designed Environment

Some preliminary studies, in terms of mental health and design, have found correlations between improved mental health and natural environmental elements.

Research has found that just 15 minutes walking in a forested, natural environment reduced stress in male college students more than in the urban environment (DeVault, 2015). Natural green environments offer better opportunities for stress management. Greater access to green space in cities has been associated with reduced depression rates (Gharib, 2017). Humans interact with the designed environment every day, ranging from walking down the street or residing in the home. Certain elements of a design effect the psychology of a person with a mental health condition more than someone who does not have a mental health condition. An environment with more rounded shapes, is linked to pleasantness and tends to make people calmer or more relaxed. Whereas elements like sharp corners with poor lines of sight are found to increase aggressive behaviors (Gharib, 2017, Khanade et al, 2018). This finding supports the previous research findings that more natural elements improve mental wellbeing (Gharib, 2017). Natural elements tend to be more flowing and freeform consequently, it is often hard to find a right angle that occurred without human influence. Nature if incorporated into the designed environment there is potential to mitigate negative mental health responses or if designers use more precedents from natural forms in designs this could produce positive mental health results as well.

Therapeutic Landscape Design Principles

The concept of a therapeutic landscape was coined by GW Gensler in 1992 to understand the place and well-being connection (Taheri et al., 2019). This application of landscape was developed to examine the healing qualities of specific vegetated sites (Winchester, 2017). Therapeutic landscape can be defined as “specific spaces of healing, particularly where the natural environment intersects with the social environment” (Winchester, 2017). When applied to a physical space the therapeutic landscape application refers to areas with healing-enhancing properties. But like most

designed spaces, the effects and experience hinges on the personal experience and condition of the individual in the space, so the healing experience might be perceived differently (Winchester, 2017).

The application of a therapeutic landscape does not have the same healing properties that medical healing does, which is linked to treatments and cures of physical symptoms (Winchester, 2017). It instead focuses on healing at a spiritual level that many medical applications cannot address. A well-designed environment can aid in the healing process with those suffering from traumatic experience. While there is no clear evidence to say that the environment can fully heal those suffering from mental disorders, it is clearly a tool in the process. (Golembiewski, 2016).

Research on restorative landscapes claims that there are six major determinates on the level of restorativeness of a space those include: A variety of subspaces for groups and individual use to provide people with a sense of control. A prevalence of green materials and minimizing the amount of hardscape. Encouraged exercise through the space to promote mental and physical health. Positive distractions such as water feature, wildlife habitat, and engaging plant material to ease the mind. Using hedges or precise spatial programming to minimize intrusions such as noise, wind, harsh lighting, and chaotic activity. A balance of ambiguity that is visually interesting enough for those who are stress free but not too abstract for stressed people (Marcus and Barnes, 1999). Applying principals of environmental psychology and creating linkages between human emotions and the built environment allows designed spaces to respond to the needs of people (DeVault, 2015).

Attention Restoration Theory

Attention Restoration Theory (ART) is a popular concept in the field of environmental psychology. Developed by Steven Kaplan, he suggests that the brains

ability to focus on a task or stimuli is limited and can result in directed attention fatigue. ART states that the observation of a natural environment or physical immersion leads to less effort in the brains functioning, allowing the brain to recover from stress and recharge its directed attention capacitive (Palatini, 2016). In order for the restorative effects of nature to take effect one must feel immersed in the natural environment, escape from reoccurring activities, the environment must effortlessly capture attention and the individual must want to be exposed and appreciate the natural environment which they are observing. (Palatini, 2016 and Kaplan, 1995)

Stress on College Campuses

While all people living in urban environments are experiencing stress from environmental stressors of everyday life, college students are a population with pre-existing levels of stress induced from the rigorous demands of coursework, among other factors. Mental health distress in students on college campuses are at an all-time high nationally. Students are experiencing higher levels of stress, depression and anxiety than previous generations (Staglin, 2019). The American College Health Association found reports in 2019, 87% of college students felt overwhelmed by all they had to do, 66% felt overwhelming anxiety, 56% felt things were hopeless and 13% seriously considered suicide. Not only are students feeling stressed from the academic demands of college but factors including distressing and traumatic circumstances during college, such as assaults (Becker, 2020). These mental health issues among students are happening at levels that campus counseling centers are not equipped with the resources to manage (Staglin, 2019). This leaves college institutions searching for a means of providing adequate mental health resources to students.

College students spend a lot of time in the university campus environment. Academic coursework requires students to attend lectures, take exams, or complete

laboratory work. These tasks require students to devote their undivided attention, which is found to elicit mental fatigue and raise stress levels (van den Bogerd et al., 2018). According to previous research study's about college students' stressors, the most commonly reported stressors include their coursework, financial issues, lack or time and meeting academic expectations (van den Bogerd et al., 2018). Because students spend much time in the campus setting during their college career, the campus is a unique setting to understand how perceptions of the built environment can influence stress among college students.

Public Health and Urban Design

Mental health issues, including stress related conditions, have largely been ignored in the global public health agenda, with physical health taking precedent. The focus of the recent World Health Organization (WHO) Global Action Plan for the Prevention and Control of NCDs is on cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes (McCay et at, 2017). In addition to shared behavioral risk factors like tobacco use, unhealthy diet, physical inactivity, and harmful use of alcohol. Mental health disorders were mentioned in the plan briefly, but not with the same focus that the physical disorders (McCay et al, 2017).

Physical and social environments can affect our mental health. With increasing numbers of people living in cities, public mental health is now expanding beyond the remit of psychiatrists and psychologists. Policymakers, urban planners, architects, engineers, transport specialists, developers, and others impact mental health planning through their contributions to the design and delivery of the urban built environment (McCay et al, 2017). Health in general and urban design do share a strong history, however, even though mental health/urban design relationship has been increasing

over the past 20 years, even recent research that tries to define links between the two is still in its infancy (Gharib et el, 2017).

Space design guidelines for people with mental health conditions most generally is lacking. Certain urban design features can have adverse effects on people who have suffered traumatic experiences (Khanade et al, 2018). Having guidelines for urban design for people with mental health disorders might help to alleviate stressors and improve their quality of life. Gaining insight into the thoughts, needs, and experiences of people who have experienced stress or chronic stress, like PTSD, can be helpful in creating these guidelines. It could help suggest certain elements in the urban environment that increase anxiety and lead to triggers for designers to be conscious of to help mitigate in future designs (Khanade et al, 2018).

A call to action exists in the current literature to find specific aspects of the built environment can help to mitigate stress and improve mental health. Because mental health is so complex and unique to each condition and individual, it is hard to plan public spaces for the whole mental health spectrum. Small steps can be taken from therapeutic principles and the fact that nature is found to make people happier and less stressed. With this in mind, focusing on each mental health condition specifically is an approach to improve mental health outcomes in the built environment. This thesis will look at stress specifically on a college campus to try and understand what design elements are preferred or if space matters in terms of improving stress for college students.

Research Design

The study was submitted to The Institutional Review Board (IRB) at the Ohio State University prior to field work being conducted, due to the nature of working with

human subjects. After submitting all the necessary material regarding methods and participant recruitment, in addition to the consent agreement, the study was awarded exempt from IRB review on January 7, 2020. Following the recruitment, methods and informed consent protocol outlined in the IRB submission, the field work was completed in about a two months' time. All recruitment and interviewing concluded as of February 20, 2020 and data transcription was completed March 7, 2020. Information regarding the research design and execution is detailed in this section of the report.

The Ohio University Campus was employed as a model for public space in the effort of understanding how the built environment effects mental health. Public space is defined by The United Nations Educational, Scientific and Cultural Organization (UNESCO) as, "… an area or place that is open and accessible to all peoples, regardless of gender, race, ethnicity, age or socio-economic level…Connecting spaces, such as sidewalks and streets, are also public spaces." Therefore, a case can be made that a college campus is a public space for the students who attend. A college campus is both an environment for learning and a public space. Greenspaces, many buildings and a setting for a variety of cultural and social activities, the campus is in many ways a place for gathering in the context of the larger city or town in which it resides (Gumprecht, 2007).

Using the context of a university and its application as a public space for students, participants were drawn from the student body. More specifically, a convenience sample of undergraduate students on one college campus was utilized. The convenience aspect of the sample was access to a large population of students and faculty for recruitment purposes in the Knowlton School of Architecture at The Ohio State University. While the study was open to all undergraduate students who attend

the university, a majority of recruitment efforts were targeted at students with a connection to the architecture school.

Participants were recruited by means of a systematic outreach approach including flyers, list-serv emailing, and word of mouth with the aid of faculty and staff in the Knowlton School of Architecture. The flyer and email stated that a study is underway to try and capture how the Ohio State Campus design effects mental health of its students (see appendix). Any undergraduate student no matter their mental health status was invited to participate in the study, if they self-selected to do so. Utilizing groups and resources already in place, the mean of recruitment was the most convenient for the research being collected.

In the recruitment strategy, prospective participants were asked to self-select themselves to participate based on their willingness to take part in the study. Since the study is particularly aimed at understanding the experience of participants on one public space application, conclusions about mental health and public space at large cannot be drawn because this would affect, the validity of the study. Due to the convenience sampling method the results do not allow for conclusions to be made outside the scope of a public space with similar features and demographics as the one being studied.

A pool of eleven individuals were identified and interviewed in a cross-sectional study to better understand how a group of undergraduate students responded or perceived certain aspects of the public space. Each participant was asked to sign a formal consent agreement stating their right to withdraw participation at any time in addition to the confidentiality of each of their response, to ensure that personal information was not attached to the final outcome. Participants were also asked permission to record the following interview and take notes.

A semi-structured interview, ranging from 30-50 minutes, with each participant included a mapping exercise where students were asked to mark specific spots on campus that they liked, disliked, felt stressed and relaxed. By means of color coordinating, likes were represented in blue, dislikes in black, stressed in red and relaxed in purple. This allowed for each feeling to be easily matched with the space on campus and for each of the eleven maps to be analyzed for similarities and differences. A clean map of the geographic confines of Ohio States Main Campus was assigned to each individual, so they could not see other's choices. The aerial map was split into North and South Campus, the north boundary being Lane Avenue, the east boundary High Street, to the south 10th Avenue and to the west the Olentangy River. Streets and other identifiable features were visible on the map so that they are easily distinguished by the lay individual. Based on the placement and determination of each colored marking, a series of questions on why they made this determination was asked to gather more information behind their choice. Notes and an audio recording were taken capture the reasoning behind each color and feeling assignment.

Following the mapping exercise, the interview component ensued where participants were asked more specifically about their experiences and perceptions. The interview format was broken down into four sections and questions were asked based on these themes. The themes are as followed:

1. Places on Campus
2. Ideal Design Features in a space
3. Experience with Stress
4. Does the space matter in terms of de-stressing?

The first theme was covered in the mapping exercise, but asked again in questions where people were asked places they liked, disliked, felt stressed or relaxed based on their own opinions solely. The second theme was targeted at specific design features and the ability to mitigate stress conditions. The design element named by the individuals were noted and compared to features are based off therapeutic landscape indicators including; balance of open and enclosed spaces, flexibility, sense of security, ambiguity, noise, vegetative elements, and social spaces. The third theme discussed the individuals experience with stress and how campus plays a role on stress levels. The fourth theme address if space matters in terms of stress mitigation and management or if space is arbitrary (see appendix). With all these themes in mind the interviews aimed at gathering information on stress in public space and how that applies to college students.

Because of the nature of stress and the level of severity of stress that college students experience, special consideration was taken to ensure that participation was voluntary and the option to opt out or choose to not answer a question was allowed. Extreme care went into crafting recruitment and interview material to not cause undue stress and trigger a stress related response. Care was also be taken to get to a level of comfortability with the participants of the study to therefore not influence their answers due to hesitancy. In doing this, transparency was of the upmost importance from beginning, so participant knew the purpose of the study and the nature of the questions before they signed up. While it can be therapeutic to talk about these experiences, that is up to the discretion of the individual. There are no trained professionals in psychology as a part of the study and participants must knew that their responses are strictly just to help advance a set of design guidelines for mental health considerations in public space.

Analysis

The first part of the study was a comprehensive mapping exercise of The Ohio State Universities Main Campus. From each participants response, a final map was produced to show where on campus students liked, disliked, felt stressed or relaxed based on the overall design, feelings and perceptions in the space (see figures 1 and 2). The second part of the study, the interview, homed in on the feelings about the space and asked more specific questions about designed features, experience with stress, and the relationship between spaces and stress. The themes which emerged from the data, include the connection to nature and access to natural elements, density and crowding, sense of community and security, personal autonomy in spaces, and visual interest.

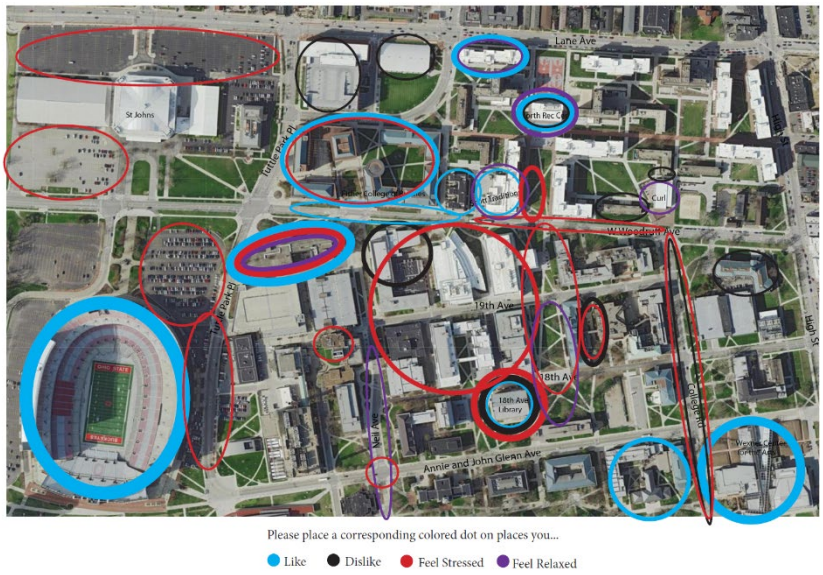


Figure 1: Map of The Ohio State University North Campus Area

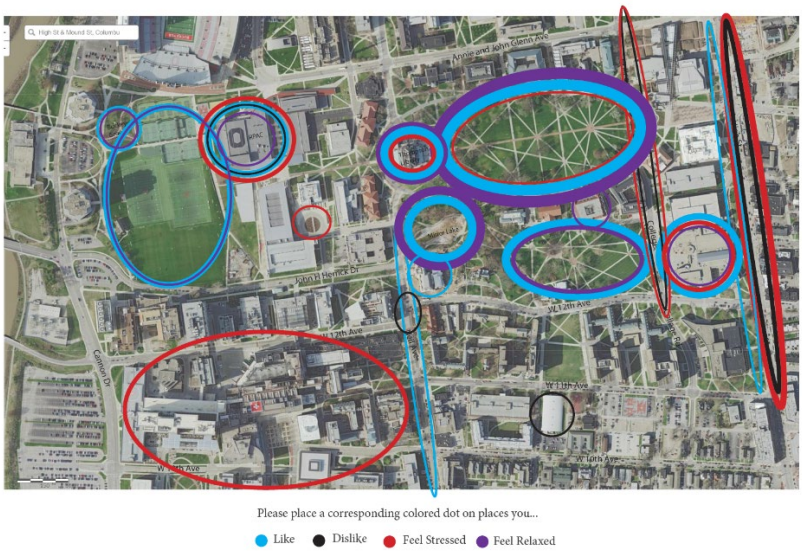


Figure 2: Map of The Ohio State University South Campus Area

Connection to Nature

From the final comprehensive map, we can see that participants shared an overall liking for spaces that incorporated vegetation and nature. Seen more readily on the South Campus map there are more positive associations (blue) and feelings of calmness (purple) around spaces containing greenery. This desire for vegetation was a commonality among the eleven participants. The main concentration of greenspace on The Ohio State University Campus is centered around the space contained to the north by Annie and John Glenn Avenue, east by College Road, south by 12th Avenue and west by Neil Avenue (see figure 2). We can see on Ohio State's campus that nature is concentrated in areas rather than being spread throughout. Having more access to nature regularly through campus could help to mitigate some of the stress we see in college students due to the restoration value that nature is found to have (Staglin, 2019). Also, engaging plant material in the design of a space provides positive distractions to help ease the mind of stressful thoughts (Marcus and Barnes, 1999).

When asked what spaces were liked based on the overall design and feelings evoked in the space almost all of the participants with the exception of one liked spaces that had a connection to the natural world in terms of materiality (materials used in the construction), greenery or natural light. Students stated places that used brick or wood in the design were preferred over spaces that were primarily steel and concrete. Glass was a common material that people said they were fond of because the access to natural light that filters through the transparent material. Windows were an important aspect that people named in a design that they liked. One student when asked what about the specific design of a space do you like stated, "…windows is a huge thing. I'm very particular about that. I hate classrooms where there is no windows. It feels very prison like."

Six out of the eleven participants did not like spaces that lack natural light and windows and the sentiment that the lack of windows made a space feel prison like was a common descriptor by more than one participant. A space that participants claimed felt like a prison was 18th Avenue Library because it lacked windows and felt very encapsulating due to the size of the space and amount of people in the space. Basement classrooms or spaces in the 18th Avenue Library that lacked windows were said to be stressful and undesirable spaces. When asked to describe the basement of 18th Avenue Library a student stated that,

> "The basement you walk in and it wasn't a cubical farm but the only thing that was missing was the cubicles. Like the lighting was fluorescent lights. There were just these long tables. Everything was gray. There weren't really any books down there it was just…a couple vending machines it was just a very weird officey type of building.

In this remark we can see evidence of people not liking spaces where they feel encapsulated and confined. The connection to nature allows for people to have a mental break and reduces stress levels in the space, so it is interesting to note that this same stress reduction factor of nature is relevant to The Ohio State University Campus.

Almost all participants with the exception on one stated that they felt the most relaxed when they had a connection to a natural space or activities that are associated with earthy elements like swimming or rock climbing. People feel relaxed when they can sit and escape from the busy rest of the campus. When asked what space was the most relaxing one student stated,

> "Mirror lake. Like specifically…like I just dig that area. It drops below pressure… that pathophysiological response that this is like a natural area that this is where I can calm down, slow my thoughts. If I can conceivably detour, I will go by mirror lake every day."

This response to nature and the calming effects and stress reduction are in light with therapeutic design principles of incorporating greenery into stressful setting. It is also interesting to note that people stated that they would intentionally seek out green spaces if they could on their walk which illustrates this connection to nature that we see people being programmed physiologically to have.

Density and Crowding

Another trend that is visible on the comprehensive map is a concentration of feelings of stress (red) and a negative perception (black) around the dense Academic Core Area on north campus. This area, as indicated in figure 3, is bound by West Woodruff to the north, College Road to the east, Annie and John Glenn to the south and Neil Avenue to the west. This clustering condition of land uses on The Ohio State

University campus exists in buildings and with the open spaces. The Academic Core Area is densely concentrated with buildings and little greenspace. This condition of density mimics that of the urban environment which has been found to provoke negative feelings and trigger stressors (White, 2013). This is where more of a break in the density with greenspace could help to mitigate stress in college students who reside on campus.

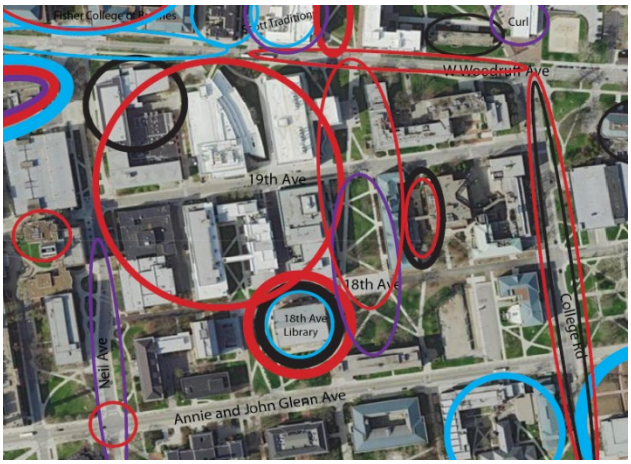
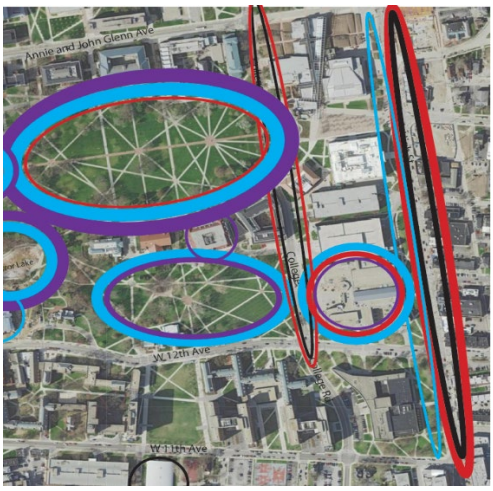


Figure 3: A view of Academic Core on The Ohio State University Campus



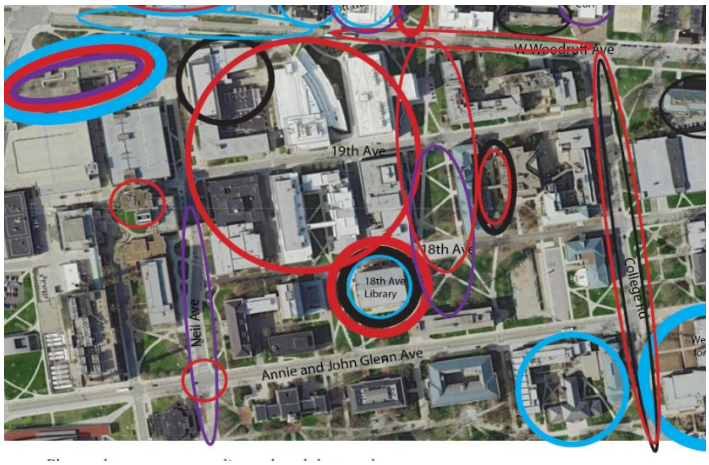


Figure 4&5: View of College Rd, High St, and W. Woodruff Ave

Three main corridors on the campus that participants named were High Street, College Avenue and West Woodruff. High Street as shown in figure 4, evokes both a positive and negative perceptions depending on the side of the street. The East side of

the street is the more commercial side and participants found that to be stressful. The West side is the side that boarder the Ohio State Campus and people were more likely to feel positively about that side of the street. Looking at the design, the west side has more green spaces than the east side and is much less dense, this aligns the claim that urban density can evoke stressful feelings whereas greenspace is more restorative (Gharib, 2017 and Marcus and Barnes, 1999). This similar feeing was mimicked on West Woodruff Avenue (see figure 5) where part of the street people felt positively about, and the other part of the street was identified as stressful. The corridor has a buffer of grass and trees that separate the pedestrian from the sidewalk the length of the street but gets smaller in the area where participants stated was more stressful due to crowding. College Road elicited mostly negative feelings, which students claimed was due to crowding and the condition of the sidewalk being right next to the street.

The amount of people in a space and the perception of crowding was the most common response for what about a space makes you feel stressed. High volumes of people and traffic in a space is stressful for students. People tend to be overwhelmed in a space where there is a lot of activity causing over stimulation and where people feel as though they are not removed from all the activity. 18th Avenue Library came up in this when asked where you feel stressed. A student responded with,

> "I think that 18th Ave Library is the best example. There's just so much going on. Like you notice the amount of people there. There is always people going in and out. Like I don't know what it is but I feel like the people in 18th are there for a short amount of time so they are just going in and out. I don't know if I notice people going in and out more just because of the environment there. I know there is always people going in and out of Thompson."

In this claim a connection can be drawn that the design of the space can make one feel less stress and can lower the feelings of overcrowding. There is a balancing factor to this perception of crowding because people like to be in a space where there is some activity whether that people or interactive design, but not too much. What is interesting though with this claim that overcrowding is particularity stressful is that when surrounded by nature the amount of people is less evident. One student remarked,

> "I think it is elements of nature in the built environment that I personally like. I can take a stroll even during the busiest point of that section and feel okay because of the fact that you always have people that are admiring the built environment in those places so it can be very congested through there because people are moving to classes but you will always see people sitting down on those seats that are there maybe looking at the lake…just someone stopping to admire. I personally like that a lot."

Perceptions of crowding and amount of people were a common element that contribute to feelings of stress. How crowded a space feels varies based on the individual so therefore, we see more setting and spaces being stated as feeling overcrowding. People said they felt stressed in spaces like the 18th Avenue Library, the east side of high street, The Knowlton School of Architecture, the Recreation and Physical Activity Center (RPAC), Academic Core, and Ohio State Wexner Medical Campus. In most of these cases it was due to the density and amount of people in the space apart from the Knowlton School of Architecture, which will be mentioned later.

Other conditions that emerged when asked what was the most stressful where spaces that create blind corners or where there is a lack of clear sight lines. Spaces like

the large planters outside of the Wexner Center of Arts or the corner of the business complex do not allow for sight around the corner and is stressful to navigate. We can see in the Crime Prevention Through Environmental Design (CPTED) literature that people feel more secure where there are clear lines of sight and they know what is around a corner. The goal of CTPED theories is to design an environment that creates a climate of safety and positively influences human behavior. Having natural surveillance of the area where one can see around them in all directions creates the feeling of security in the space and reduces feelings of stress ("Crime Prevention Through Environmental Design Training Program").

To better understand the participants perspective about what elements of the design of a space makes them feel stressed, they were asked to name areas and examples on campus that made them feel stressed. Crowding and high volumes of people again come up in this conversation. Places that are high density where building are very close together feel crowded to some people. Too much density might not be a good thing in the built environment because of the stress that some participants named in these areas. Sidewalk width also led to feelings of crowding. A sidewalk where only one person in each direction can walk at a time is stressful. If people feel like they cannot pass another, this led to feelings of agitation that can spike levels of cortisol, a stress response (Millard, 2016). The feeling of too many people in a space for the size also induces stress but, what is too much is highly indicative to a specific individual but the way they space is design can increase this density threshold.

Sense of Community

While too much population density can be problematic, participants also do not prefer spaces with no people or human activity. This is known as goldilocks principle, the concept of just the right amount, and in the context of urban environments

researchers discuss “goldilocks density”. An environment must be dense enough to support a vibrant street environment and enough to build a sense of community but not where people feel confided and slip into anonymity (Alter, 2014.)

The participants tended to gravitate toward spaces that have some amounts of human activity and a built-in sense of community. Three participants stated that they like to have a sense of community in a space. They wanted to have other activity going on in a public space but a choice in their level of interaction with others. Some level of noise rather than silence was preferred. Noise was said to include music, nature sounds, or low voices. This ties into the idea of comfort that other people provide in a space. The idea that there is some sort of sound in the space makes it feel less isolating and like there is someone else or something else in the space too. People are innately social creatures, so it is not unusual that they tend to not prefer spaces where they are isolated.

In terms of building community people tended to state they would be more inclined to stay in a public space if comfortable seating existed. Participants liked seating that was movable or customizable. Whether a chair or a bench it didn’t matter as long as it met the dimensions of an average human scale and was suitable, they would sit. People are more relaxed with they are comfortable in a space and that makes them want to stay. When they do not feel a level of comfort in the space they tend to seek out places that provide for this need.

There were two participants though that stated they avoided places where they did not feel a sense of community or belonging. This made them feel uncomfortable in the space and to not to like to go. One participant talked about the contrast between North and South Campus and feeling more of a sense of community on South Campus because it did not have the busy bustling nature of North Campus where most of the

academic building are concentrated. One statement that stood out was a student's feelings about the Ohio Union where they stated,

> "I avoid the union like the plague. It just gives me anxiety when I am there. I feel like I am in high school again and that's where all the popular kids are. I'm like just get me out of here. It's like I am walking into a lunchroom again. I feel like that is just the hub of the school."

The busy nature of the Ohio Union can be stressful for some who may be predisposed to anxiety and stress. Because it is so busy in the space and a lot of people are concentrated in an area it can be hard for people to find this feeling of seclusion and personal space that people need to feel relaxed and secure in a space. Being aware of the effects of designing and programming a building like the Union where so many activities are concentrated could allow for some therapeutic design interventions that make the space feel more comforting and less overwhelming for some individuals.

Sense of Security

The lack of protection in a space or a feeling of being vulnerable or exposed was a condition that two participants described. Large parking lots with no places of protection given the vast asphalt pad are stressful for some because there is a lack of perception of protection. The student stated, "They are wide open in an unnatural way. That part of your brain that says if I have to start moving very fast to avoid a predator where am I going to go, I am in the parking lot."

Another student talked about the feeling of comfort in places where the sidewalk is right up against the street is stressful versus one with a protective permeable barrier. A patch of grass or trees provides the perception of protection from

cars. The sense of protection that this buffer gives reduces levels of stress while also providing a natural vegetative element that is known to have stress reduction effects. (DeVault, 2015)

When asked to describe an ideal relaxing space and what that is like including all the 5 sensory elements, students like to feel a sense of security in the space where they can be around some people but keep to themselves. There is security and a perception of security when there are some people or a place that feel like their own. Some participants described their bedroom for a space that was at least semi-private.

Visual Interest

Visual interest was a common theme to emerge in spaces that people liked and disliked. Building that have more historic characteristics and look different from the surrounding buildings were preferred over building that looked the same. South Campus one student remarked as feeling "more homey" and stated that it felt more historic and welcoming than north campus. The Fisher College of Business was a space that one student said,

> "…it does lack visual interest because with the southern part of campus it is the more historic aesthetically design part but the buildings are different so although they are the historic feel you can tell this is this building this is that. Whereas with the college of business I couldn't tell you which building is which they all just run together."

When we look at the questions of spaces that participants disliked three of the eleven stated that they did not like buildings and complexes that all look that same and lack variety or features in the architecture that differentiate the two. Having space

between buildings also makes it easier to differentiate between buildings and create separation. Talking about Academic Core a student said,

> "Academic core buildings are stressful when you start new classes because it is hard to tell which is which. I feel like this whole area is jumbled into one mess of a building. Over on south campus they are more spaced out where they have their own lawns and stuff. Even with just the trees there is something in front of it where it is not building, building, building, building."

Personal Autonomy

Trying to connect the ideas of relaxing spaces to public space, participants were asked to describe their ideal public space and what able the space makes them want to be there one idea that emerged was that people like to have control over what they do in the space. The public space needs to provide options in terms of what can be done in the space. Having a multipurposed space is preferred to one that only allows for one specific activity. Amenities like food, restrooms, and activities also were preferred as people can choose to seek these out. People like to have an activity to do in the space or things to do around it where they can use the space.

Stress and Space

As shown on the maps, there are certain spaces that provoke different feelings and perceptions depending on the individual and their experiences in the space. Knowlton Hall, for example, was a location that participants stated they felt positively about but also stressed and relaxed (depending on the individual and how the building was experienced). Perceptions about Knowlton Hall revealed that there is a fondness for the design of the building its access to external greenspace and the stressful course work that students are exposed to alters the perception of the building. It is important to note that stress may not be connected to the space itself but the activity

that happens inside the building. For some students it was hard to decipher what about the design of a space was stressful if they had a connection to the space where academics were very stressful.

Stress and predisposition to stress varied among the study of participants. Of the eleven participants, five stated that they had sought professional help to deal with stress at some point in their lives and six stated that they had never sought professional help and manage stress on their own. Stress is different for everyone in terms of triggers, intensity and management. So, asking participants how they dealt with stress and if they sought a particular space or activity helped to home in on the final overarching idea of does space even matter in terms of stress and stress management and what are participants thoughts on the idea.

As had been assumed because of the complex nature of stress, participants destress in many ways. The most common underlying theme was that when stressed participants were looking for a way to distract themselves from the stressful situation at hand. They stated they needed a way to take their mind off of things and not be on a time schedule. Some students found hanging out with friends to be a way to destress. This sense of community that people feel is comforting is a way that some people choose to destress. What was interesting is that people stated that nature was more relaxing but to destress most did not claim any activity or space that had a connection to nature. Most people agreed that the space did matter in terms of stress management, but the activity matters as well. One student stated,

> "I think that subconsciously you feel less stressed when you are in a certain environment. Like when I am going to Hale Hall to study versus the Union. I am going to feel less stressed at Hale because the environment is more like secluded and it feels like more conducive to feeling better."

Some participants were able to see the connection between the space and activity in the space and how that makes them feel, others were not. This leaves for room to explore how much about the design of a space and relaxing design would affect conscious thoughts and feelings of stress reduction. If designed with stress reduction in mind would people even be able to decipher what about the space is relaxing or stressful?

Discussion

Drawing on previous research related to mental health and the built environment, along with data gathered in this study there were four key concepts that emerged. These include connecting the building on campus to natural environment, the contrast between natural landscapes and hardscapes on campus, density and crowding, and creating visual interest rather than sameness.

Connection to Natural Environment

Better connecting nature to the buildings on campus could help to provide for this innate fondness of nature that we have as human beings. The application on a campus such as Ohio State University could take many forms. In the study, evidence suggests that participant preferred natural, vegetated areas over those which are dense and mostly buildings. This urban condition of density is known to cause stressors through lack of lighting and reduced sense of security (White, 2013). Participants in the study felt more relaxed when they felt a sense of secure in a space and had access to adequate lighting, preferably natural light. A buildings windows was a common idea that revealed itself when participants named positive design features. Windows allow

for natural light to filter in a space so a building with adequate windows and natural lighting can provide a stronger sense of security in the space and create views to nature.

Looking at examples of buildings on campus there are two buildings that came up frequently in discussions with the participants and provide a good example how the design of the building can or cannot provide the connection to nature. 18th Avenue Library and Thompson Library, while both serving the same function, they are vastly different in their design and in turn overall perception in the space. 18th Ave Library as many of the participants claim lacks windows and natural light whereas Thompson Library has many large glass windows and, in the center, utilizes an atrium which allows views to the sky. The glass material and higher ceiling make the space feel more open and does not feel as confining due to the opacity of the glass material. Thompson Library is much larger in terms of size so this could also factor into the feeling that there is less people because they can spread out but also the way that the desks are arranged allows for people to have their own space for seclusion which we see in therapeutic design being important. Having separate desk rather than long tables like in 18th Ave Library give people a since of ownership of the space and a place that feels like there's for the time in which they are in the space. The long desks do not allow for much flexibility of the space because it is harder to move a long table than a small table and chair. Thompson also allows for more seating options than 18th Ave Library which is important to note, so depending on ones preference for activity in the space or seating type there is a wider range of choices that people can make in the space. It allows for more personal autonomy in the space which makes for a more comfortable environment as well as the connection to nature.

Figure 6: A view of 18th Avenue Library displaying the small windows and the large brick façade

Figure 7: Thompson Library is designed with many large windows and a more interesting facade than of 18th Avenue Library

Incorporating more natural features such as vegetation or flowing lines in architecture can help reduce stress among college students. Creating designated greenspaces around the building and looking at therapeutic landscape principles in the design could help those predisposed to mental health conditions such as chronic stress better relax. This would help to break up the existing density and create more pockets of greenspace that participants in the study seemed drawn to. Also looking at biophilic design, which brings nature into the building, could help introduce elements

of nature in interior spaces. Biophilic architecture connects the building occupants to nature through natural lighting and ventilation, and landscape features. Bringing nature to students in the classroom could help to promote restorativeness inside the building rather than having to be in a traditional landscape (Seven Principles of Biophilic Design). This could help in areas on campus where there is not the land available to dedicate to greenspace. With biophilic design density can be preserved while nature is introduced, producing better mental health outcome for the occupants.

Contrast between Natural Landscapes and Hardscapes

The contrast between natural and designed environments and the effects on people's mental health is an aspect that a college campus like The Ohio State University could benefit from due to the rise of college students stress levels. In the urban environment, hardscapes, such as sidewalks, roads and plazas, are a common condition in urban area. Urban environments can also include large open spaces such as parks that provide a break in the hardscape. This holds true for the campus environment at The Ohio State University where the periphery is surrounded by large asphalt parking lots and a spattering of open green spaces such as The Oval and Mirror Lake can be found. On the university campus as with cities hardscapes and non-pervious surfaces are much more common than greenspace or pervious surfaces. We often see more larger parking lots than greenspaces in our urban fabric which is not conducive for positive mental health outcomes.

The open condition of a parking lot compared to the open condition of a green space evoke a different set of perceptions and feelings about a space. As shown in the study, there is something about the ground plane being grass rather than asphalt that speaks to people's feelings and bodily responses. While both being open conditions

people don't feel as secure in a parking lot as they do in the Oval (figure 8). One student claimed that his fight or flight response kicks in when in the parking lot outside St Johns Arena, on campus but it does not when walking through the Oval (figure 9). The fact that the access and connection to greenspace that is perceived to have the same open condition as a parking lot can evoke feeling of calming is important to note. Would parking lots on campus benefit from having more vegetated elements in terms of making students feel less stressed when in these spaces?

Figure 8: The Oval on the Ohio State Campus is a large green open space surrounded by campus buildings.

Figure 9: The parking lot outside of St John Arena is one of many large parking lots on the edges of campus.

It is clear to see that a campus such as Ohio State contains more hardscapes than natural spaces. The focus of a university is academics so greenspace might not always be a top priority in the context of land-use. Green spaces might need to be considered by university administration as they are found to not only positively impact mental health but have been shown to increase academic achievement. Researchers at the University of Illinois Urbana-Champaign found that students who had a view of a green landscape from their classroom building scored higher on tests and recovered faster from stress caused by testing. (Cobb, 2017) Their research supports the idea of Attention Restoration Theory where views to the natural environment are found to provide mental recovery (Palatini, 2016 and Kaplan, 1995).

It is important that college administration utilize this information when future campus plans are being created. With literature that reveals green spaces are more restorative and statistics that show students on college campuses are more stressed than ever before, decision makers have data to advocate for more access to greenspace or green intervention on campus from a public health standpoint. If incorporating greenery into the campus environment can be shown to lower rates of stress in college students, there could be a policy introduced outlining optimal levels of greenspace per building square footage. Providing greenspace on campus cannot be looked at as only a minor issue any longer but, rather a critical piece of campus infrastructure as it has been shown to improve academic performance, increase mental health recovery and allow for more spaces of relaxation (Cobb, 2017).

The study found that over half of the participants in the study dealt with stress management on their own rather than seeking professional help, providing green spaces that are accessible to students is important. Students who are dealing with

stress management on their own are going to be looking for these relaxing spaces. People who live around green spaces are less likely to have depressive thoughts and have anxiety, in addition it builds community (Cobb, 2017). Students are going to find more restorative value walking through green spaces on campus rather than large swaths of concrete paths and buildings. With a large population of students on The Ohio State University Campus having a health and happy community takes the stress off mental health services and provides students a means to de-stress on their own.

Density and Crowding

The concept of density is on the forefront of urban design agendas in the world today. Urban density is the number of people living in an urban area. Urban planners advocate for higher densities because of theories that cities operate more efficiently when people live in denser urban areas (Seven Principles of Biophilic Design). It has been found that living in places with higher density has social, economic and environmental benefits if the spaces are mixed-use, walkable and pedestrian scale (Taylor and van Nostrand, 2018). While there is no ideal density threshold, traditional zoning laws set maximum densities for parcels and districts and Interior spaces of building set maximum occupancy numbers for the room safety measures, so there is a standard for a space being too dense. In a public space, how can we as planners set and determine what the ideal density of the space is in terms of number of people?

Density is useful for describing urban form in quantitative terms but not so useful when looking at qualitative factors. The experience of density is beyond that of a number and effects the behavioral factors in the space. Perceptions of the built environment are shaped by individual cognitive and socio-cultural factors (Taylor and van Nostrand, 2018). In the study, participants stated that many areas felt crowded but

how crowded an area felt and the number of people varied depending on the space. Areas in which people called dense due to the number of buildings also varied. While there might be no perfect quantifiable density measurement there is certainly an approximate density threshold based off of what is low and extreme density.

Crowding is different than population density because density refers to the number of persons per unit of space. Crowding is more of a phenomenon of intensive and uncontrolled stimulation resulting from environmental stressors. Crowding is dependent on the lack of control and freedom in the physical space (Kivanc, 2016). Physical factors of the space such as size, ceiling height and window views and lead to the feeling of crowding and stress. As shown in the study people like to be in a space where they feel some level of personal autonomy and when an area is perceived as crowded, they no longer feel in control (Kivanc, 2016). It is known that nature is a means of calming and has restorative value and one student from the study claimed when they were in a green space they noticed less of the people in the space. Can green space on campus help to reduce the feelings of density in areas that have a high building per square footage ratio. As colleges look to admit more students, can the feelings of crowding be mitigated with additional green space? Or do the calming effects of nature help to reduce feeling of stress and increase the density threshold in that environment?

Visual Interest

Participants in the study seemed more drawn to buildings on campus that had unique architectural character and variety. Most people stated they liked buildings that were unique or had a historic quality over buildings that lacked variety and looked identical to another. Research in cognitive science shows that bland streetscapes take a

physical and mental toll on individuals. People are found to function better in intricate setting and crave variety (Urist, 2016). As claimed by Colin Ellard, a neuroscientist at the University of Waterloo, “The holy grail in urban design is to produce some kind of change every few seconds.” (Ellard, 2015) Boredom that is created through architectural blandness can generate stress. Boredom increases heart rate and levels of cortisol in the body on the adverse side over stimulation can lead to stress as well (Urist, 2016). The key is to create environments that are interesting but do not overload our cognitive processes.

Building that were considered interesting by participants in the study were among the older building on campus like University Hall and Orton Hall (see figures 10 and 11). University Hall is a large brick building with many windows. The stepping in the façade where it its not along one straight plane is interesting as well as the angles of the roof. Orton Hall is constructed of stone and features intricate statues and a bell tower. The unique and sculpted shapes of the building are visually interesting to the eye. Complexes like the Fisher College of Business (figure 12) have numerous buildings constructed of mainly brick. The facades follow a relatively straight plane and are boxier in nature excluding the rounded addition on Mason Hall. The series of building in the complex are similar in the design building to building and can arguably lack the variety that researchers like Ellard state are needed to not induce boredom.

Figure 10: University Hall

Figure 11: Orton Hall

Figure 12: Fisher College of Business Complex

Given the historic nature of buildings on college campuses and the value that the architectural detail and variety might have on student's mental well being, there could be support of preservation policies on campuses. Once the historic fabric of a building is destroyed it cannot be brought back to its authentic state. Following recommendations from the National Register of Historic Places and the 50 year guideline, when a building is over 50 years old it can be considered for a historic designation (Buono, 2005). Having a policy on campuses like Ohio State to preserve the historic buildings not only helps to protect the cultural fabric of campus but also can help to contribute to the level of visual interest that helps to reduce stress responses.

Conclusion

Feelings of stress can influence perceptions of public space and certain factors included in a design of a space can mitigate stressed responses. A space where people feel a connection to nature, a sense of belonging, secure, engaged and could exercise a level personal control over the space where found to be more relaxing whereas, the absence of one or more of these themes lead to feelings of stress. Stress, like many

mental health conditions is complex and one design intervention, set of design guidelines, or policy change is not going to solve the public health issue of deteriorating mental health and wellbeing in urban dwellers, just as this intervention on a college campus is not going to alleviate all the stress students face. As the study revealed the design of a space contributes to the stressor's students face but, other factors such as coursework, personal experiences, and traumas can shape perceptions and feelings of a space as well. It is in the design of the space that designers can take approaches such as adding natural elements, creating architectural interest, and dedicating spaces for seclusion or interaction, that we can take a step closer to creating synergies between mental health and urban design.

The study revealed some interesting themes and underscored the literature behind the restorative nature of greenspace and principles of Crime Prevention Through Environmental Design, more data is needed to understand how designed conditions influence levels of stress and relaxation. Additional studies in different geographic locations and population could reveal more insights to designed preferences and stress responses. Data gathered in the study contributes to the small but growing body of knowledge of mental health and urban design.

Limitations

This study comes with its limitations and the findings cannot be generalized to all public spaces due to the scale and duration of the project. Due to the tight timeline of four month to complete the study only a small area could be analyzed and only a small population could be interviewed. The Ohio State Campus while it shares some commonalities with the definition of a public space it is not representative of all public spaces. This study to test the findings would need to be replicated in another public space before generalizations could be drawn.

Due to the need to find participants quickly a large portion of the sample were architecture students. With having a pool of participants who are familiar with analyzing the built environment their answers could be slightly predisposition. It is important to note that participants in the study stated similar answers whether they studied architecture of not so that does not skew the validity of the results.

Much more research is needed to understand ideal design features in public spaces that can help alleviate stressed responses. This study is one means to contribute to this field of study and provide connections to environmental psychology literature and urban design. While this study alone cannot be formed into any specific design guidelines, it can speak to other researches and literature in the future as this topic is explored.

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Figure 6: Google. [Google Maps of 18th Avenue Library]. Retrieved from https://www.google.com/maps/@40.0019596,-83.0128708,3a,75y,227.54h,90.97t/data=!3m6!1e1!3m4!1smBrNg9G5sBxx1ooY4j25hQ!2e0!7i13312!8i6656

Figure 7: Collado, D. (2019, March). [Thompson Library]. Retrieved From https://www.google.com/maps/@39.9991926,-83.0148625,3a,75y/data=!3m8!1e2!3m6!1sAF1QipNTPHvJT179jYRDzk450JSs2WSZDKNLXh0CKgIq!2e10!3e12!6shttps:%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipNTPHvJT179jYRDzk450JSs2WSZDKNLXh0CKgIq%3Dw203-h174-k-no!7i3099!8i2661

Figure 8: Google. [The Oval]. Retrieved From https://www.google.com/maps/@39.9995755,-83.0122004,3a,75y,95.67h,85.67t/data=!3m8!1e1!3m6!1sAF1QipPFbQHdJGQjB8Q__TFYQH5vuTuM2UTUy8NdAr-s!2e10!3e11!6shttps:%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipPFbQHdJGQjB8Q__TFYQH5vuTuM2UTUy8NdAr-s%3Dw203-h100-k-no-pi-0-ya114.32098-ro-0-fo100!7i8000!8i4000

Figure 9: Google. [Google Maps of parking lot on the south side of St. Johns Arena]. Retrieved from https://www.google.com/maps/@40.0045146,-83.0194093,3a,75y,275.97h,85.74t/data=!3m6!1e1!3m4!1sWlySN5_j1jcOrbvieiObmA!2e0!7i16384!8i8192

Figure 10: University Hall. photograph, Columbus, Ohio. Retrieved from https://www.osu.edu/map/building.php?building=339

Figure 11: Google. [Orton Hall]. Retrieved From https://www.google.com/maps/@39.9987121,-83.0119596,3a,75y,169.43h,86.11t/data=!3m6!1e1!3m4!1sz6ntZ9kLmR5NSG7s6GMSqg!2e0!7i13312!8i6656

Figure 12: Fisher College of Business, photograph, Columbus, Ohio. Retrieved from https://fisher.osu.edu/undergraduate/contact-us

Appendix:

IRB Approval Letter:

Office of Responsible Research Practices
300 Research Administration building
1960 Kenny Road
Columbus, OH 43210-1063

orrp.osu.edu

01/07/2020

Study Number: 2020E0011
Study Title: How does stress impact perception and experience in public space?

Principal investigator: Jason Reece
Date of determination: 01/07/2020

Qualifying exempt category: #2b

Dear Jason Reece,

The Office of Responsible Research Practices has determined the above referenced project exempt from IRB review.

Please note the following about this determination:

- Retain a copy of this correspondence for your records.
- Only the Ohio State staff and students named on the application are approved as Ohio State investigators and/or key personnel for this study.
- Simple changes to personnel that do not require changes to materials can be submitted for review and approval through Buck-IRB.
- No other changes may be made to exempt research (e.g., to recruitment procedures, advertisements, instruments, protocol, etc.). If changes are needed, a new application for exemption must be submitted for review and approval prior to implementing the changes.
- Records relating to the research (including signed consent forms) must be retained and available for audit for at least 5 years after the study is closed. For more information, see university policies, Institutional Data and Research Data.
- It is the responsibility of the investigators to promptly report events that may represent unanticipated problems involving risks to subjects or others.

This determination is issued under The Ohio State University's OHRP Federalwide Assurance #00006378. Human research protection program policies, procedures, and guidance can be found on the ORRP website.

Please feel free to contact the Office of Responsible Research Practices with any questions or concerns.

Jacob Stoddard
stoddard.13@osu.edu
(614) 292-0526

Questions:

Places on Campus

- What places on campus do you like based on the overall design and feel of the space? What about the space makes you feel this way? What features could be improved to make you like it?

- What places on campus do you dislike based on the overall design and feel of the space? What about the space makes you feel this way? What features could be improved to make you like it?

- Where on campus do you feel the most stressed? Is it in a particular building, while walking, an open space? Why, is it something about the space specifically?

- Where on campus would you say is the most relaxing or do you feel the least amount of stress? How often do you go here? What about the space makes you feel relaxed? Is there a specific element that you are drawn to?

- Is there any place that you avoid walking or going to on campus? Why do you choose to avoid it?

Ideal Design Features in a Space

- When you think of a relaxing space what do you think of? Can be on campus or just in general. Can you recall elements of that space to me? What does it look like? Smell like? Sounds? How many people? Is there places to sit? Is it open or more secluded?

- Do you notice any features or designed elements about the campus that make you feel stressed or uneasy? Is there a particular walking path or building?

- What do you look for in a public space? Seating? Recreation? Entertainment? What makes you spend time there?

Experience with Stress

- Do you notice any changes in how you experience and feel in public spaces when you feel more stressed/anxious compared to when you are not?

- Have you sought professional help in dealing with stress or anxiety?

Does the space matter in terms of de-stressing?

- How do you typically destress? Where do you go? What do you do?
- If it's an activity could you do this elsewhere and it have the same effect?
- Before this interview have you ever thought about how a particular space makes you feel or not?
- Does the space matters in terms of stress management? If so in what way?

Email Template:

Subject: Stress and the Built Environment: Undergraduate Research Study

Hello,

You are invited to participate in a research study about stress and the built environment on The Ohio State University Campus.

About the Study:

If you are interested in participating, you will be asked to participate in a mapping exercise of campus outlining places you like, dislike or feel more or less stressed. Following the mapping exercise, you will be asked questions about ideal design features in public space and experiences with stress. Participation is voluntary and at any point you can withdraw your participation. The study is expected to take up to one hour. The goal of the study is to better understand what elements in the built environment contribute or mitigate stress in college students on campus.

How to Participate:

You must be 18 or older to participate and be a current undergraduate student enrolled on The Ohio State University Columbus Campus. If you would like to participate in the study, please contact Taylor Brill at brill.91@osu.edu.

Thank you in advance for your time. If you have any questions, please contact brill.91@osu.edu.

Taylor Brill, Co-Investigator

The Ohio State University

Flyer

PUBLIC SPACES AND STRESS AMONG COLLEGE STUDENTS

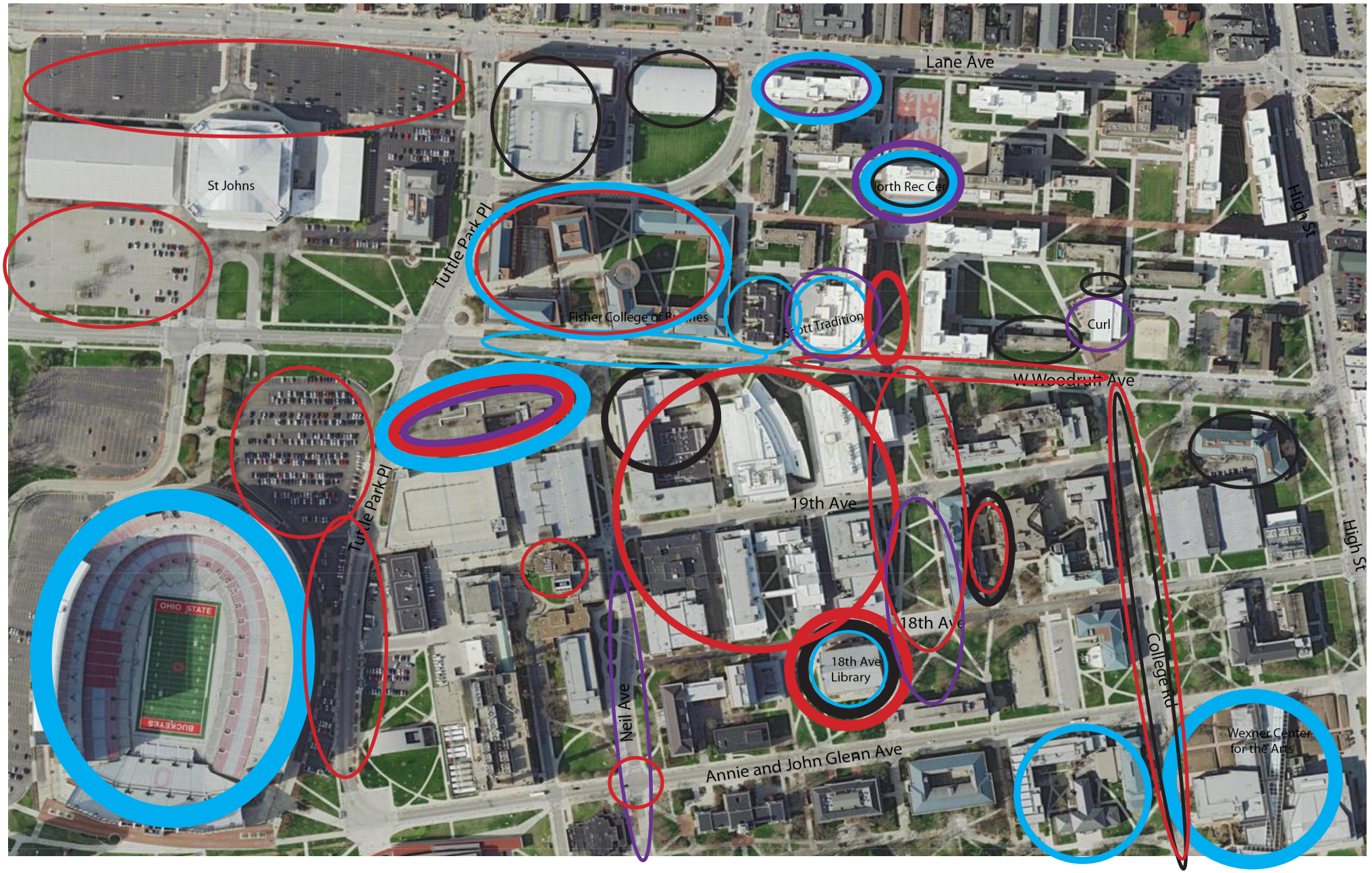
Help build an understanding of mental health and urban design

INTERESTED? EMAIL BRILL.91@OSU.EDU FOR MORE INFORMATION!

Participate in an undergraduate research study centered around spaces on campus and levels of stress to help inform a set of design guidelines for campus planning. The hour long study includes an in person mapping exercise and interview.

Maps

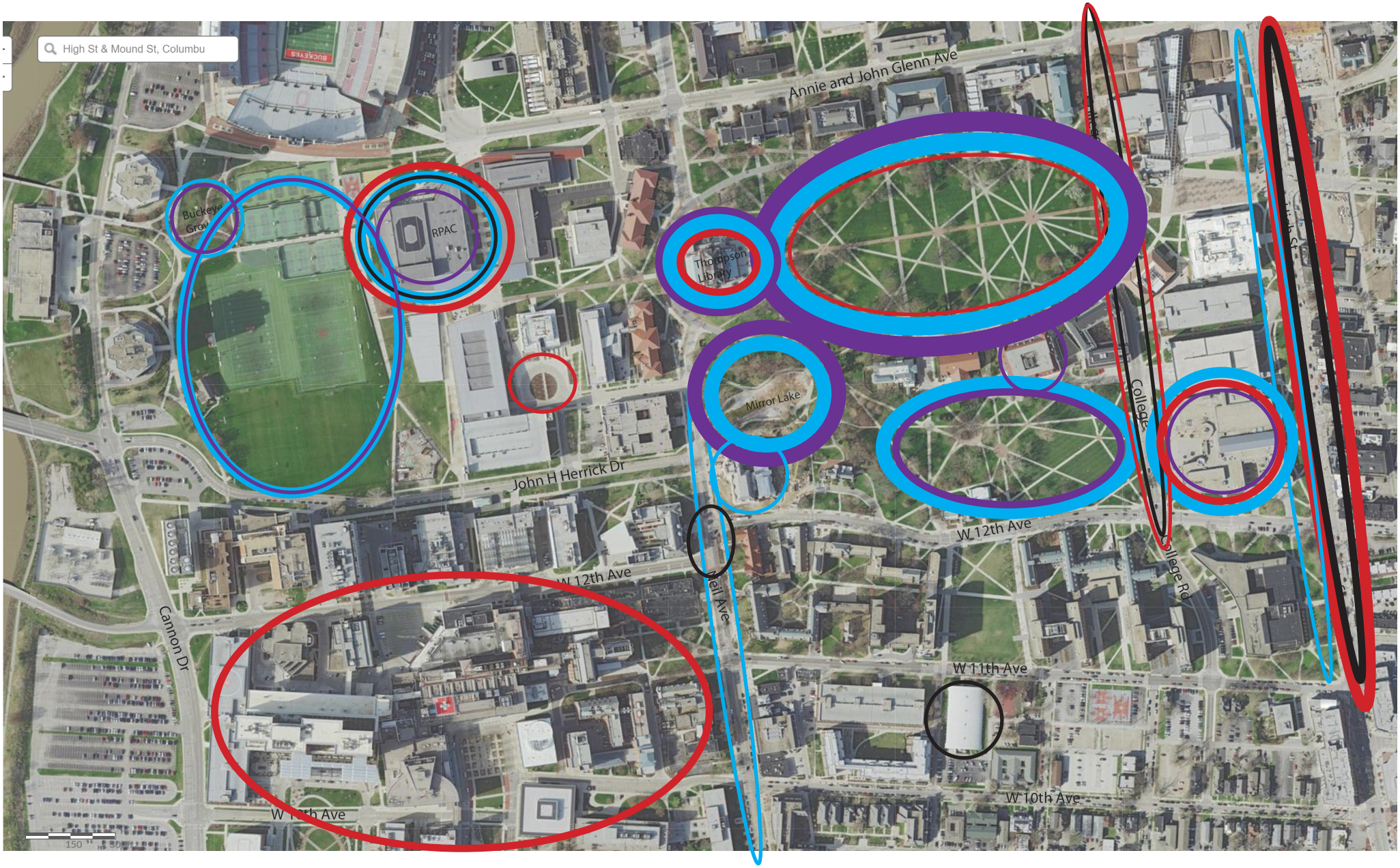
North Campus Map



Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

South Campus Map



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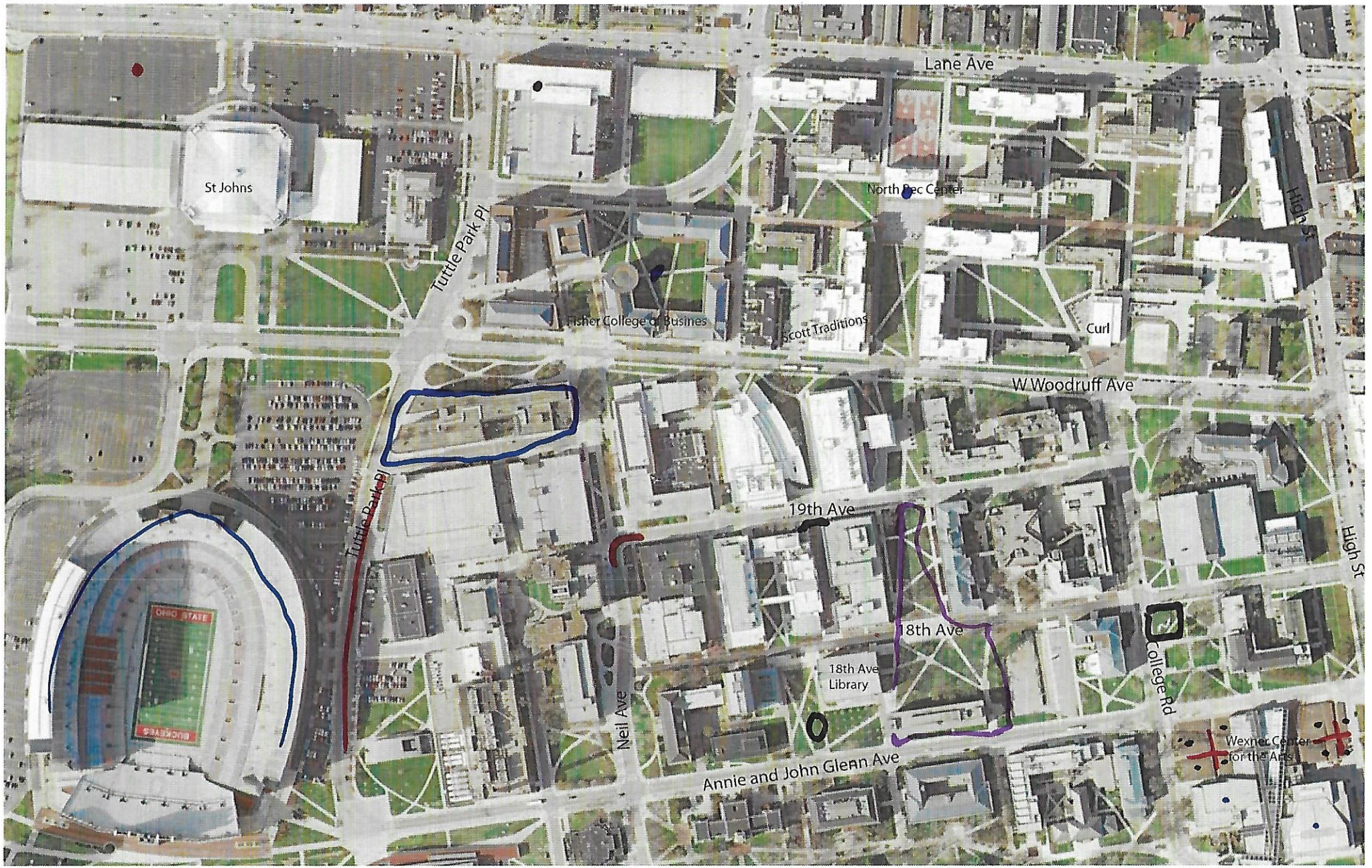
Like Dislike Feel Stressed Feel Relaxed

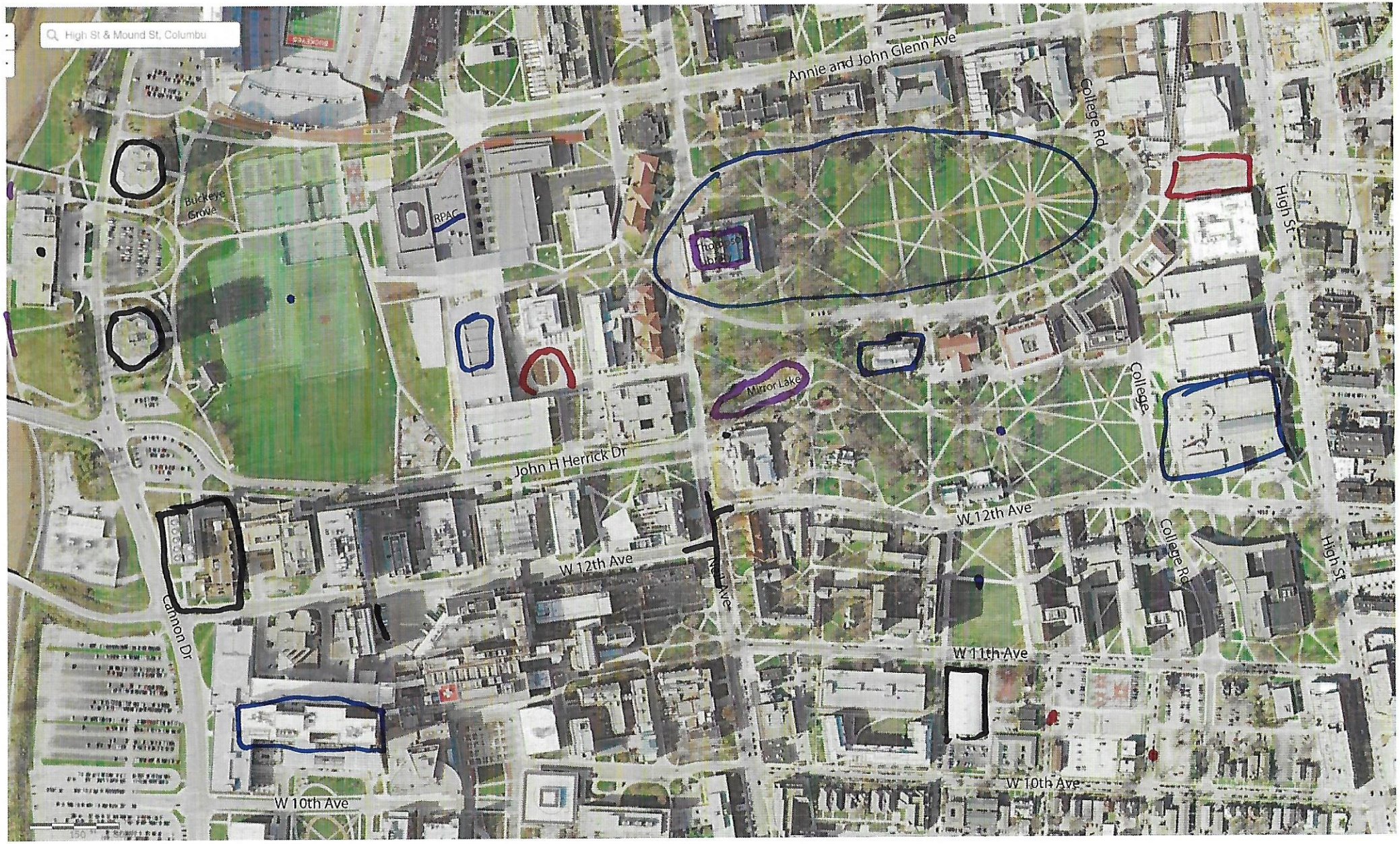
North Campus Map



Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

South Campus Map



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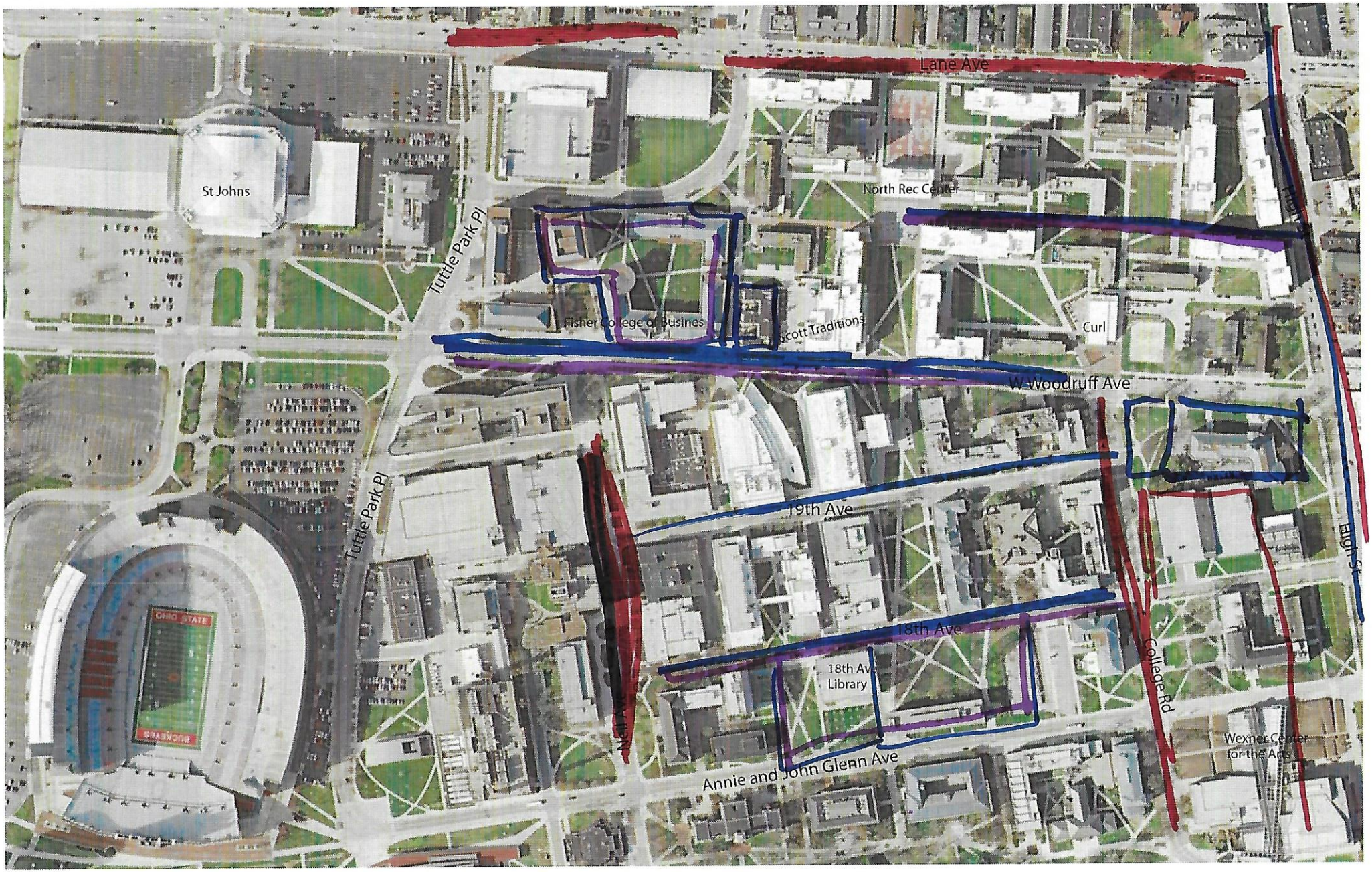
Like Dislike Feel Stressed Feel Relaxed

North Campus Map



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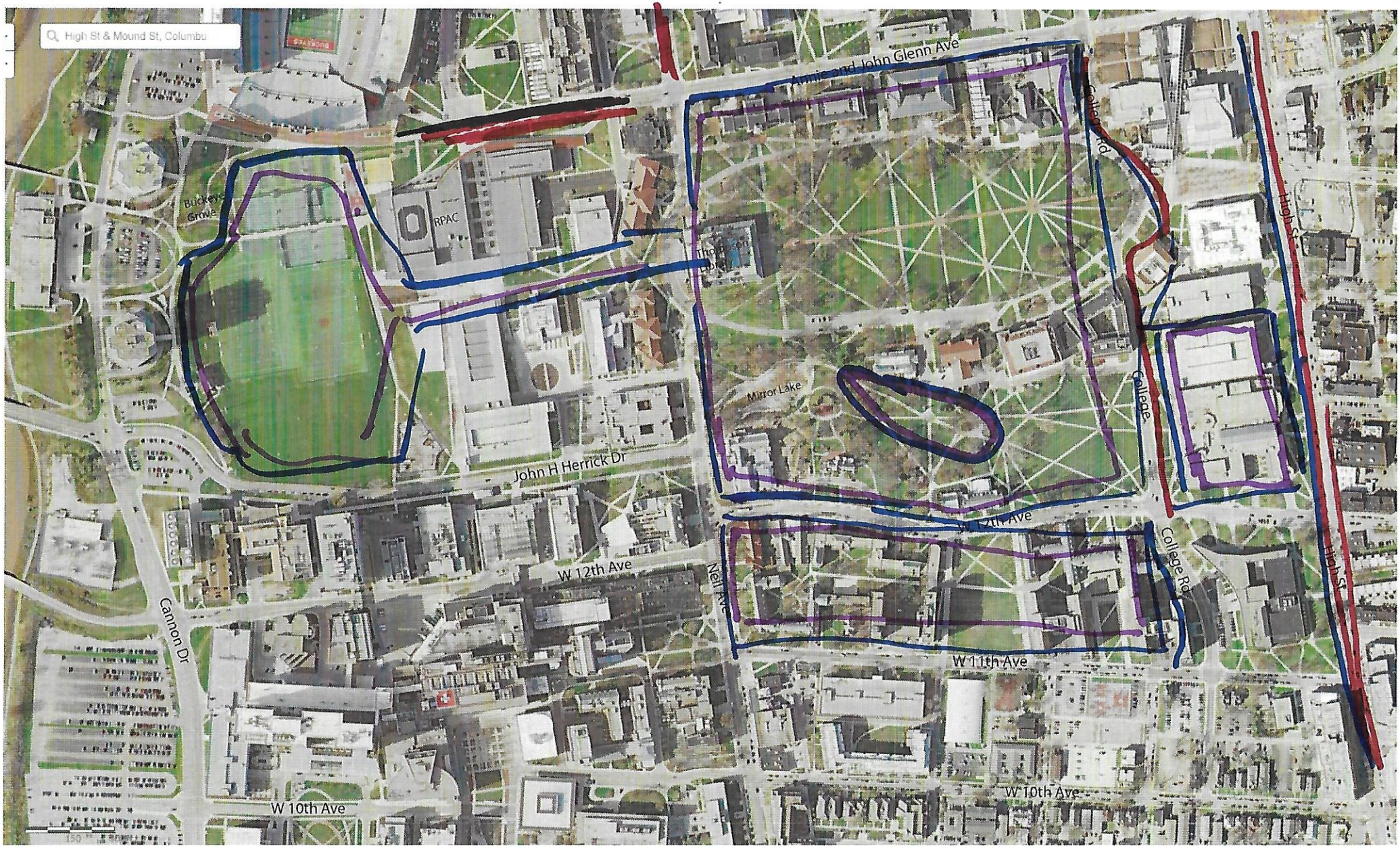
Like Dislike Feel Stressed Feel Relaxed

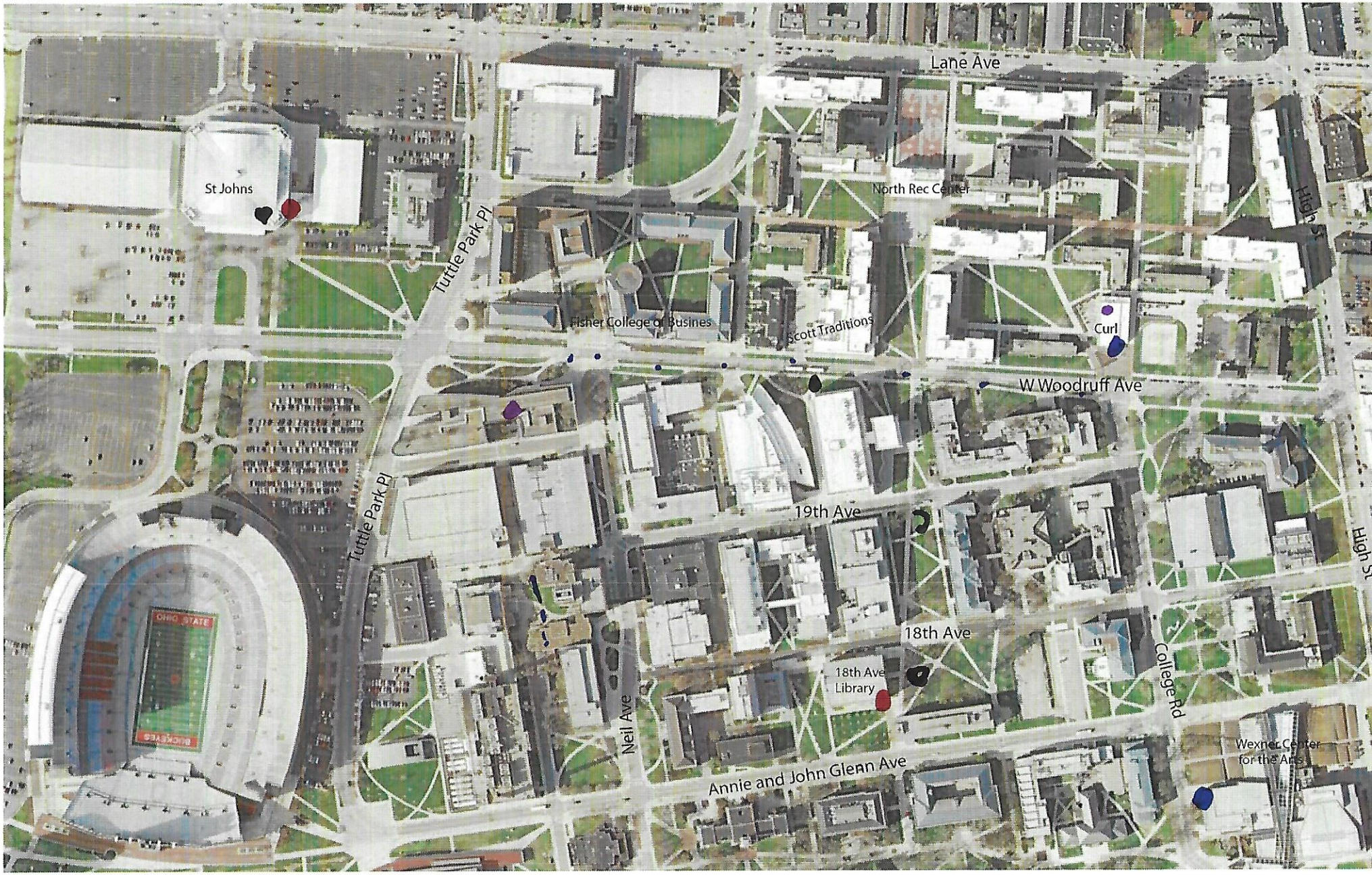
South Campus Map



Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

North Campus Map



Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

South Campus Map

Please place a corresponding colored dot on places you...

- Like
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- Feel Stressed
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PB

North Campus Map

Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

RB

South Campus Map

Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

85

South Campus Map

Please place a corresponding colored dot on places you...

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- Feel Stressed
- Feel Relaxed

RS

North Campus Map

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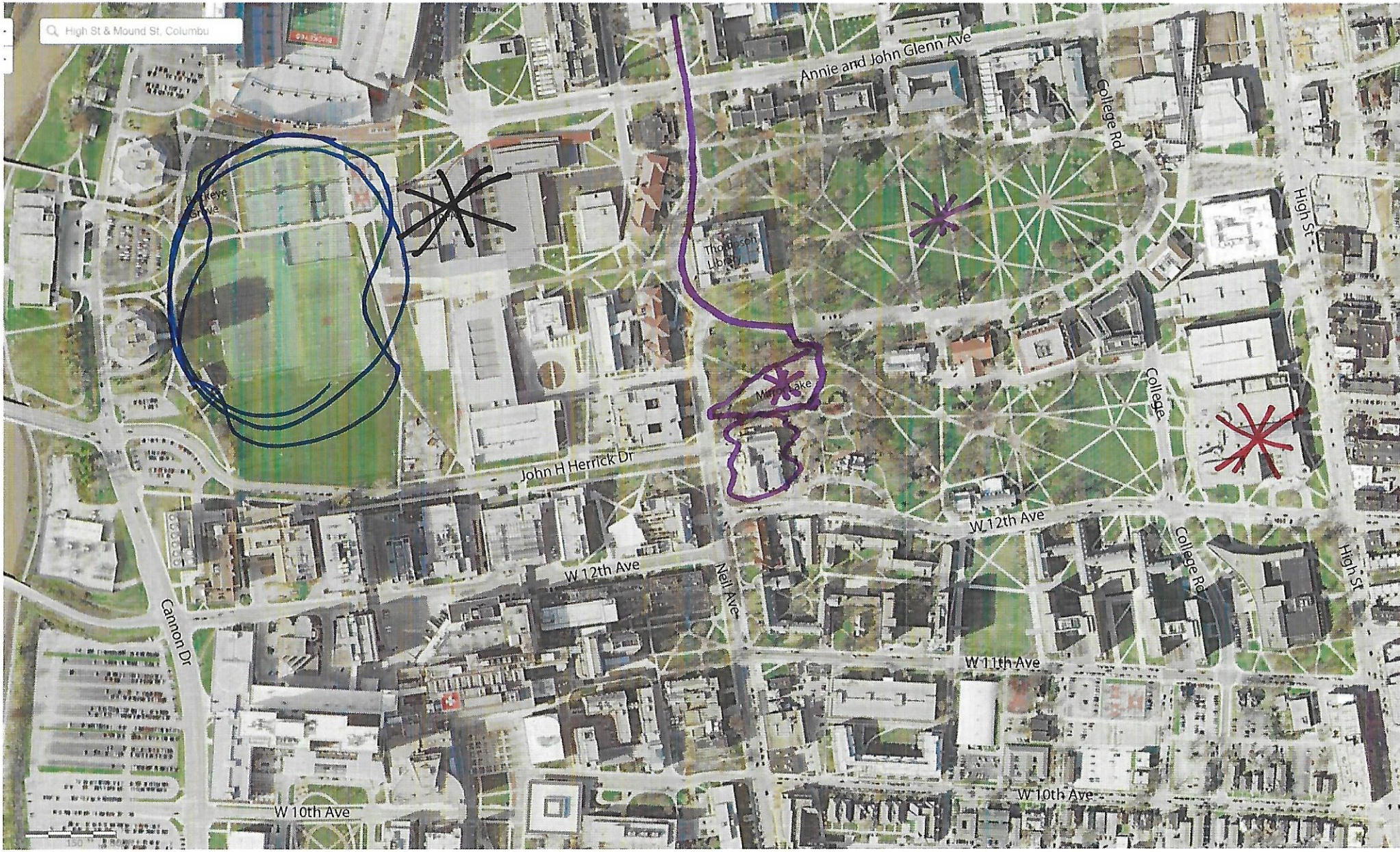
9

South Campus Map

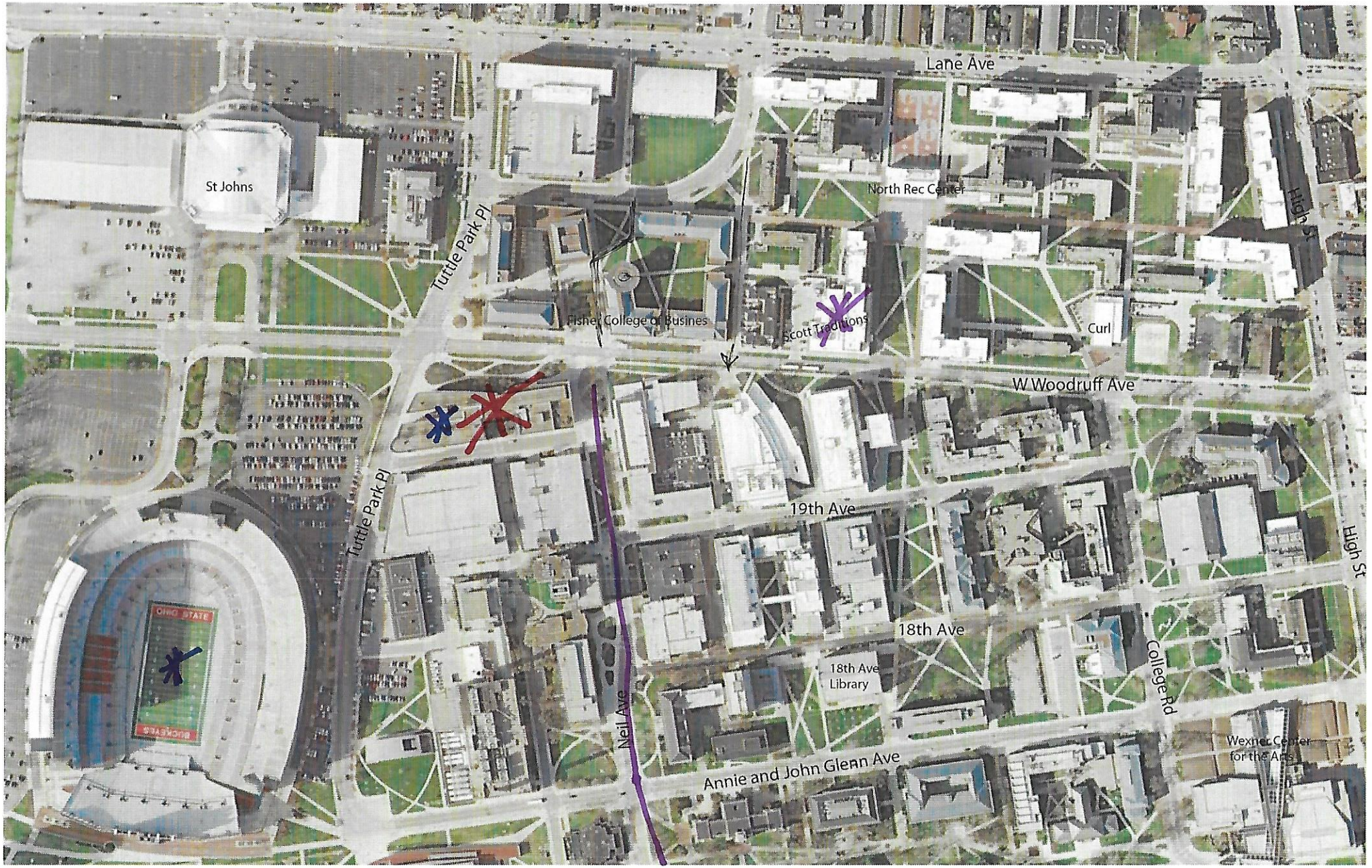


Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

MW

North Campus Map



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Like Dislike Feel Stressed Feel Relaxed

JP

North Campus Map

Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

JP

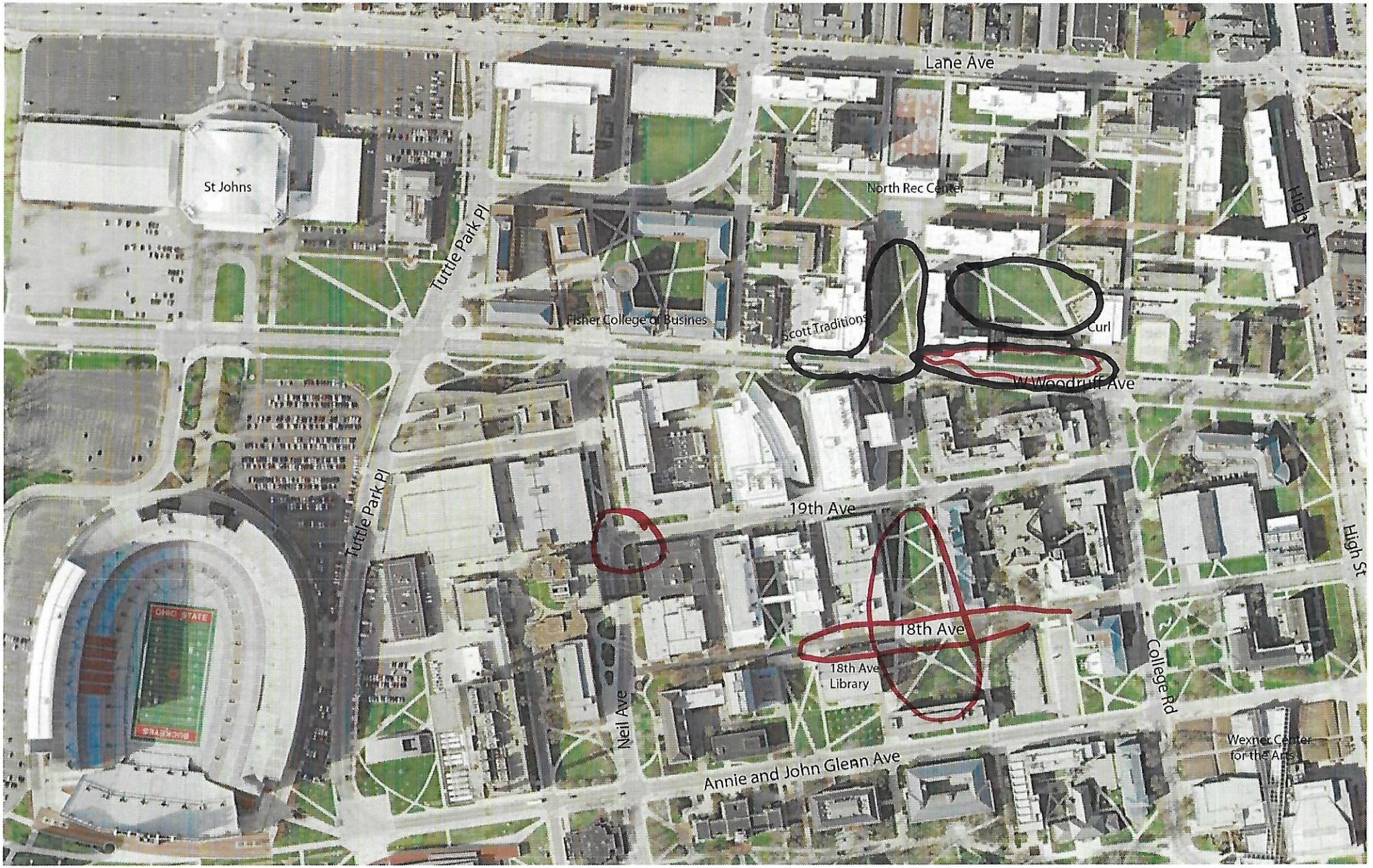
South Campus Map

Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

8A

North Campus Map



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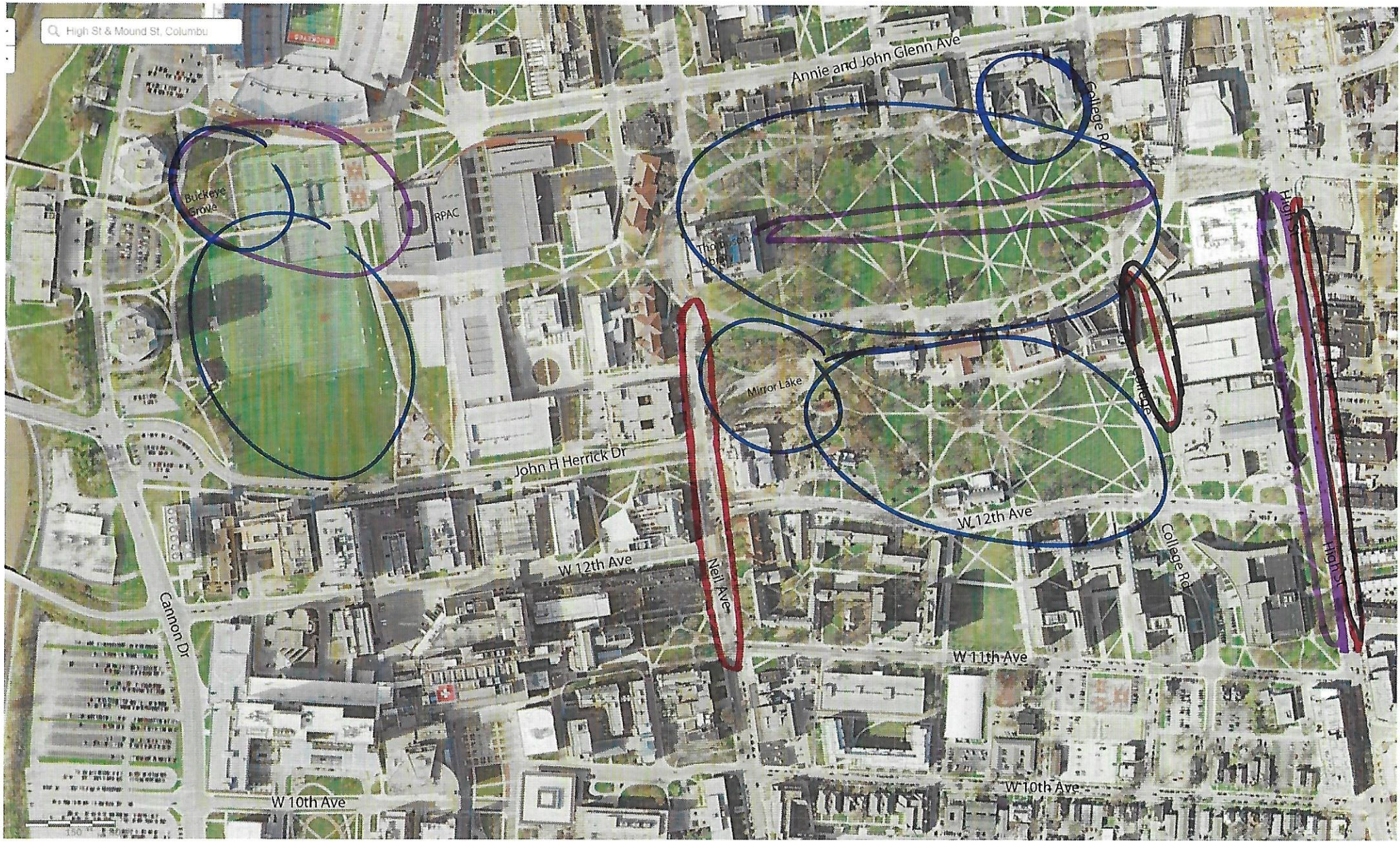
8A

South Campus Map



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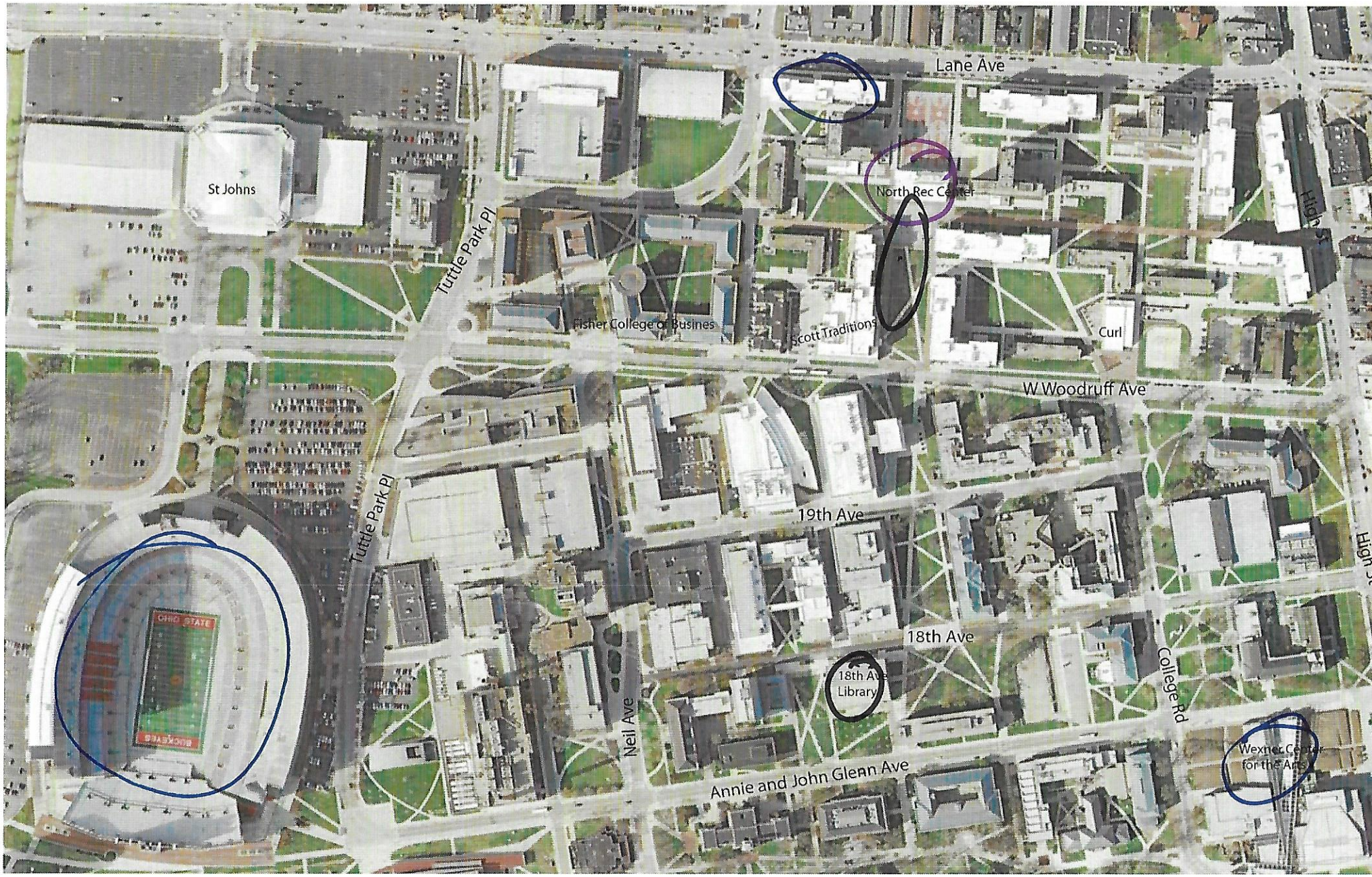
Like Dislike Feel Stressed Feel Relaxed

JF

North Campus Map



Please place a corresponding colored dot on places you...

- Like
- Dislike
- Feel Stressed
- Feel Relaxed

JF

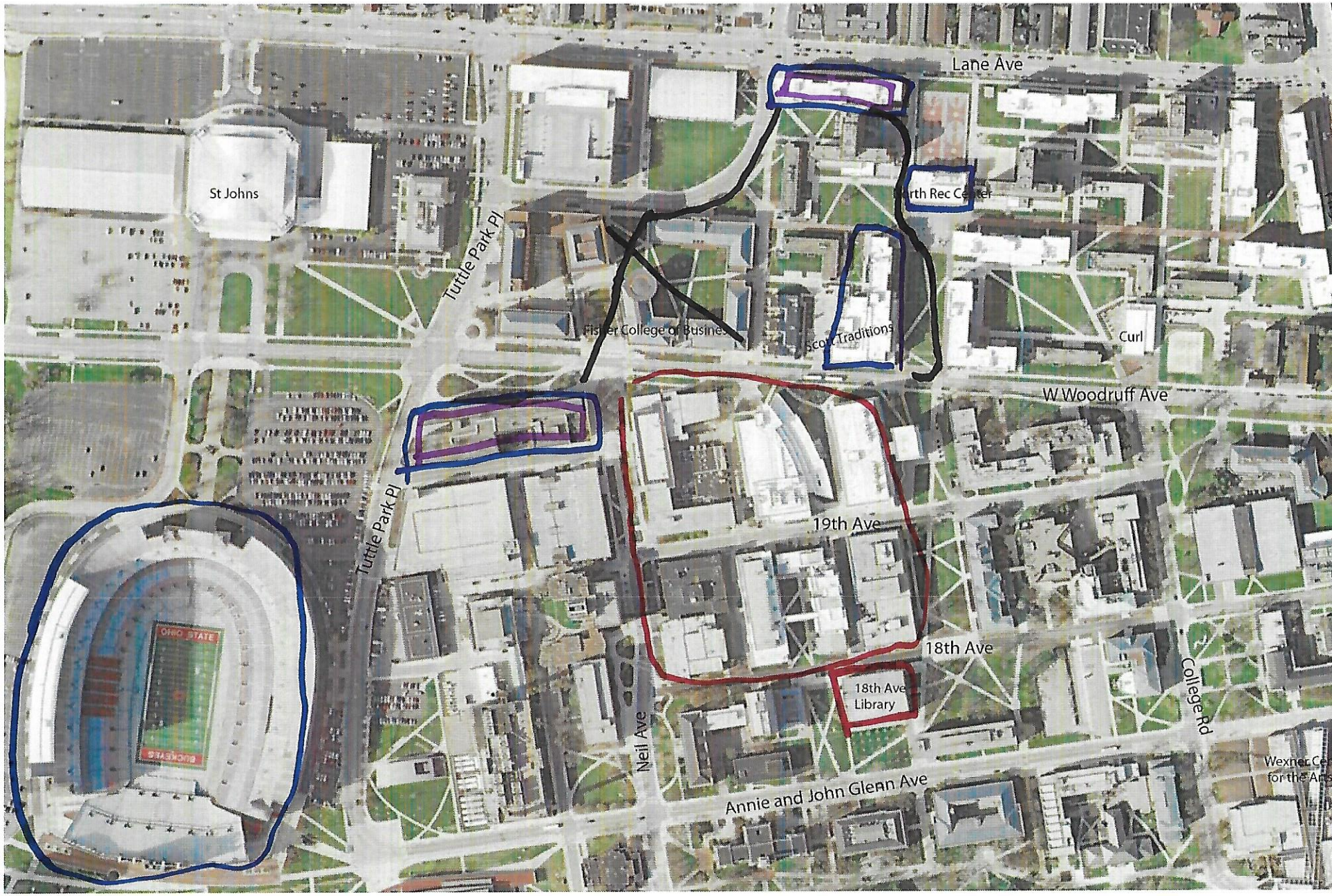
South Campus Map

Please place a corresponding colored dot on places you...

Like Dislike Feel Stressed Feel Relaxed

H18

North Campus Map



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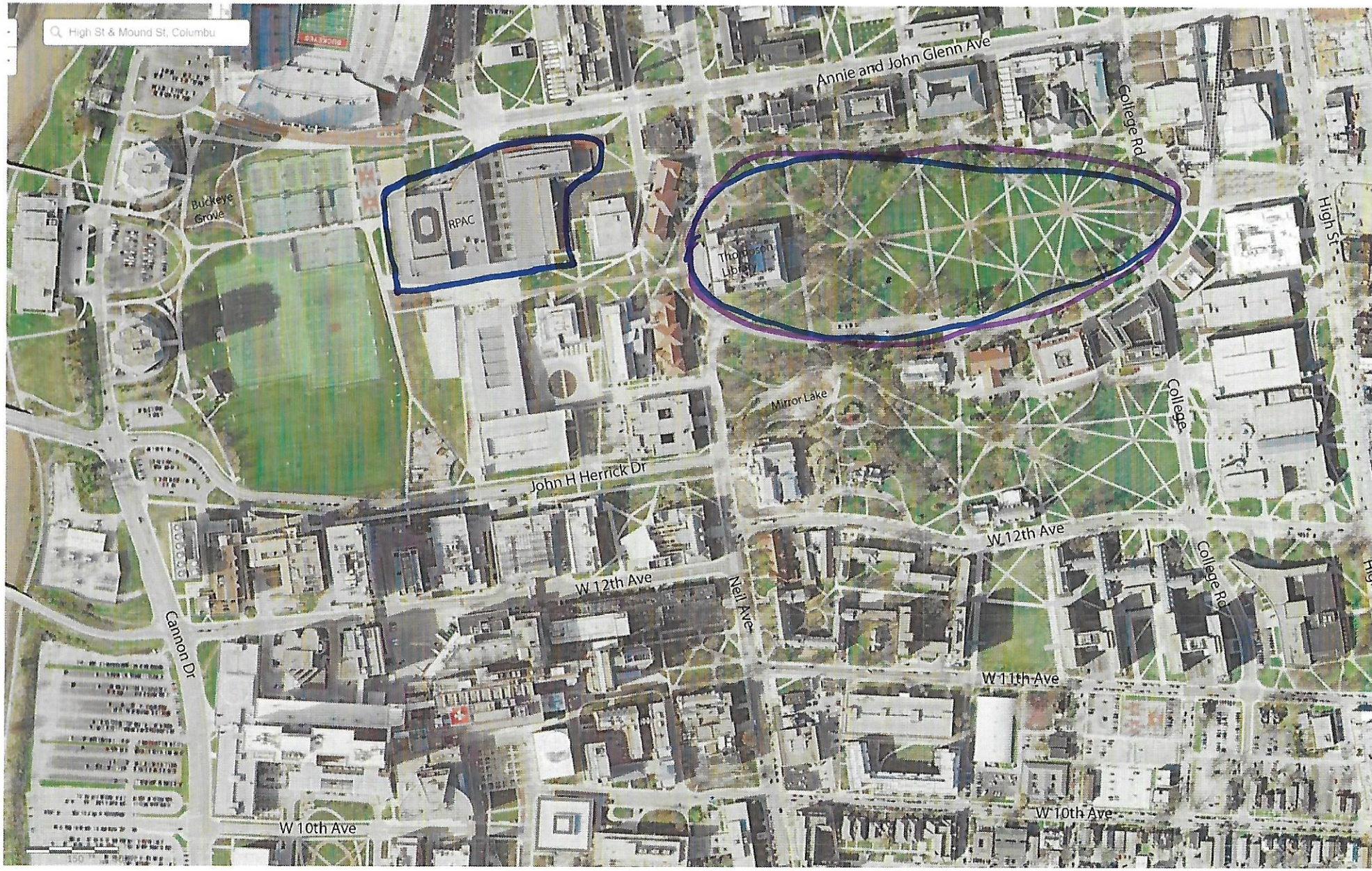
H6

South Campus Map



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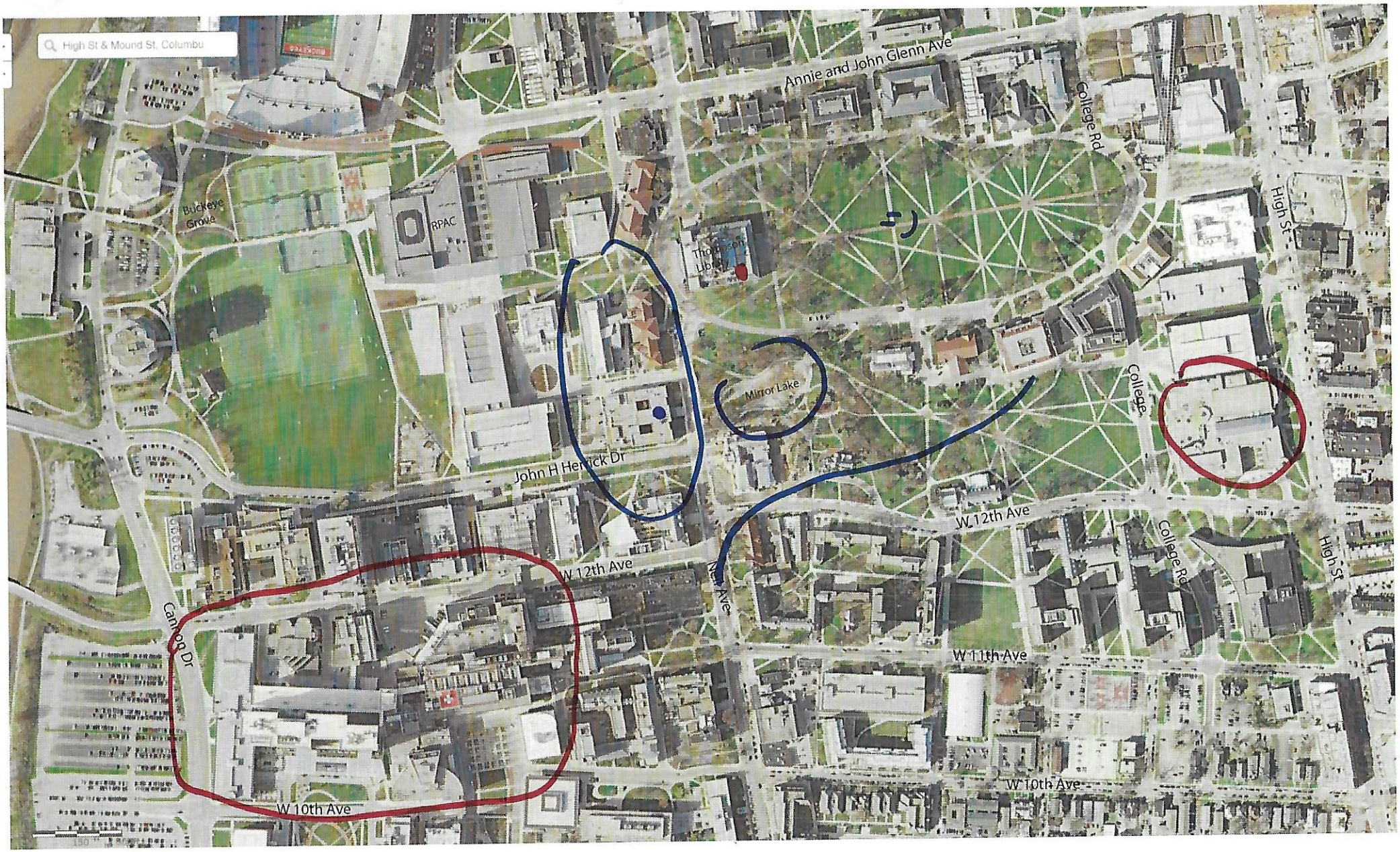
Like Dislike Feel Stressed Feel Relaxed

mc

South Campus Map



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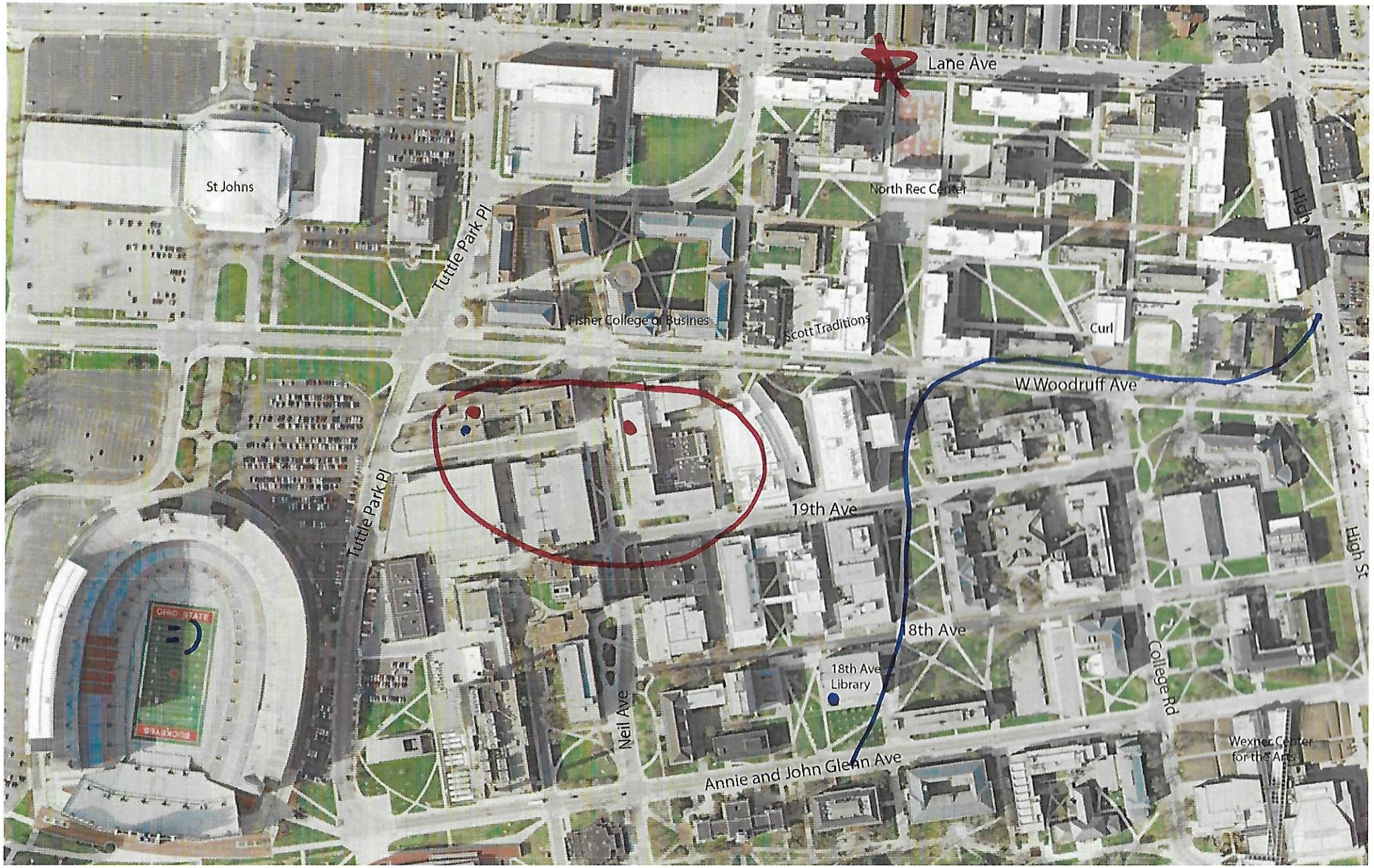
mc

North Campus Map



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